



FRIDAY, JULY 31.

Sliding of Wheels by Automatic Brakes.

The regular July meeting of the Western Railway Club was devoted to the discussion of this question, after a brief address by President Pierce, in which he noted that the railroad mileage of the six states surrounding Chicago was almost 35,000 miles, nearly one-fourth the mileage of the United States, and that there was much room for usefulness for a club such as theirs at the centre of such a system.

Mr. W. B. SNOW opened the discussion: They were arranging leverage on each car differently according to the weights on the wheels, and not according to the Westinghouse general plan, which gave too strong leverage. The great difficulty was the unequal distances the piston runs out, which trainmen, unless cautioned, are apt to meddle with. He had thought of using a spring to get an even pressure, but as a different spring would be needed for every car, it did not seem practicable.

Mr. COOKE found a great cause of trouble was the difference in the pressure carried in the air-drum, and even when fixed at some uniform rate it was sometimes tampered with. Some roads carried 60 pounds pressure and some as high as 110 pounds. He would be glad to know a way to release the brakes more quickly; that was a chief source of trouble.

Mr. SNOW found the spring in the triple-valves was often too weak. They did not have so much trouble from skidded wheels with suburban trains, which stop often, as on the cars for longer runs. They seldom had flattened wheels on suburban cars, but he has sometimes had other cars spoil six or eight sets of wheels a year.

Mr. COOKE had tried a coiled spring—say 15 in. long—which was not touched nor acted on until the piston had moved out some distance, to aid in releasing brakes more quickly. He had it on several coaches and it worked well.

Mr. VERBRYCK was using the Westinghouse brake as arranged by Mr. Westinghouse, and found it to work well, although the greatest trouble was in brakes not releasing. He thought, with Mr. Cooke, that sliding wheels was, in general, the fault of engineers; but they had little difficulty. In the winter trouble was sometimes caused by getting a little water in the triple-valves.

Mr. COOKE, under such circumstances, had simply cut out the automatic attachment, working with "straight air."

Mr. VERBRYCK preferred the plan of cutting the brakes entirely off of one car, letting the air pass right through rather than to use straight air.

Mr. SNOW had experienced the same difficulty, but had a man to examine every triple-valve before it went out, making certain that it was in good order. He computed the power for each car from the weight of the empty car resting on the braked wheels. Their suburban cars only ran from 15½ to 16 short tons, which required light brake power.

Mr. VERBRYCK had never built such light suburban cars. Their passenger cars were much alike now, of all classes, and averaged 19 short tons complete. He had built some suburban cars, however, which weighed 33,000 lbs.

Mr. SNOW preferred suburban cars very light. Some of their regular cars weigh 23 to 25 tons. They used the Hodge system to even brake pressure. He did not believe in springs.

Mr. SINCLAIR thought that, after all, it chiefly depended upon the engineers. Some of them were amazingly ignorant of the mechanism of the brake. He had noticed that wheels do not slide so much when they first apply the brake as when they begin to slacken up a little. They almost always slid just before the stopping point, because they were easily slid when the motion is slower. He supposed the reason was that the tendency of the wheels to keep rolling was not so great when the revolutions become few per minute, and consequently they were more easily slid.

Mr. VERBRYCK, answering a complaint of Mr. Snow that wheels were not round, thought that if Mr. Snow would put every wheel in a grinding machine and make them round, as he did, he would not have so much trouble.

Mr. COOKE reminded Mr. Verbruyck that he was luckier than some of them in having that instrument.

The propriety of having some uniform standard of pressure, so that the power of the brakes could be more correctly adjusted, was then dwelt upon by several of the gentlemen present, Mr. Cooke thinking a pop-valve in the end of the cylinders would answer a very good purpose, and Mr. McClure suggesting that the governor recently put in to regulate the Westinghouse pump would answer every purpose. Mr. Snow, however, objected to this and was inclined to think the most effectual plan to stop sliding would be to charge up every slid wheel against the guilty employees. They have taken off not less than 32 wheels in one year from one car for "slid flat" wheels.

The following subjects were then chosen for discussion at the August meeting:

1. Best method and material for lubricating locomotive valves and cylinders.

2. The seating of cars for suburban traffic.

Mr. Cooke made a few remarks explaining the working of the Hunter spark arrester, which he said they found very satisfactory.

Contributions.

Billing Prepaid Shipments—Making Out Vouchers at Receiving Stations.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The clumsy and antiquated way in which the fast freight lines bill prepaid shipments is one evidence that the work necessary to run a railroad has not yet been reduced to the lowest point, whatever may be said about the money expenditure. To bill a shipment "collect," necessitating the regular making out of a voucher and entry on cash book at destination, and then go to the trouble of doing up the money, sealing it with wax and delivering it to the express company (after filling out their receipt), is, to say the least, about as roundabout a way as could possibly be taken to attain the desired object. The revenue on other shipments on the same line bill is divided among any number of roads without any superfluous writing whatever, and it would puzzle anybody outside of railroad circles to divine a reason why the place of payment (whether starting-point or destination) should make any difference in the principle on which the money is accounted for; perhaps it would puzzle

those within railroad circles if they should stop to think of it a moment.

While on the subject of old-fogysm, I am reminded to query whether the prevailing plan of making out vouchers may not be considered as coming under that head, or dangerously near it. When a way-bill arrives at a station it is wanted, if the goods have also arrived, by the clerk to make the vouchers, and by the checker or tally-man to compare with the goods at one and the same time. If it arrives ahead of the goods, it doubtless comes in a great majority of cases in the night or early morning when the freight office is not open, so that the inconvenience is virtually the same as though it came with the goods. The labor is the same whether the vouchers are made where the way bills are, or at the other end; but in many cases, perhaps most, it could be done more conveniently and economically at the former. In cases where the receiving station is not large enough to afford a night clerk, the sending station could often do the work at seasonable hours, say 4 to 7 o'clock in the evening, while the receiving station would have to do it before 7 in the morning. Early rising is a good habit, but a clerk's services are not generally worth so much before breakfast as they are in the latter part of the day, because there are so many different things then needing to be done. If a clerk having flexible hours imagines that he can do his work up early in the day and thus secure partial or entire relief in the evening, he finds on trial that circumstances foil him; calls of customers, late trains and various other things happen in such a way that he must be on duty in the latter part of the day, so that if he begins early he simply lengthens his hours at both ends instead of only one, as he otherwise would.

Voucher clerks are notoriously careless in their penmanship, or, rather, they are notoriously careful to abbreviate so excessively that nobody but themselves can tell what the document means, and perhaps a changing around might be the means of effecting an improvement. If a certain station, say Philadelphia, or Kenduskeagville Junction, made all the vouchers for its outward shipments, the name of the "place from" could be printed and so have some meaning to the consignee; all receiving stations having dating stamps of uniform pattern could then insert their own name in neat and legible shape, on the upper right-hand corner in a suitable large space left for the purpose. When the name of the last-named station is printed the other has generally to be written, because printing would necessitate too great multiplicity of forms; by the plan suggested both names would appear in print.

The New Interchange Prices for Wheels and Axles.

TO THE EDITOR OF THE RAILROAD GAZETTE:

As you suggest that No. 9 of the new rules for the interchange of traffic, adopted at the Old Point Comfort Convention, was drawn up "in close accordance with" some suggestions of mine published in your issue of June 5 last, it may not be out of place for me to make some remarks on the subject of your editorial of July 11, on "The New Interchange Prices for Wheels and Axles."

In the communication above referred to, I only aimed at the defects of the old rule No. 11, pointing out its lack of information on matters brought up by the rule itself, its want of clearness of meaning, and, above all, its unsuitableness to a debit and credit system of accounts.

I had nothing to say as to what the prices should be; nothing about changing the form of bill, nor was it within my scope to suggest changes in the latter, with a view to prevent or detect the crooked ways of individuals whose moral education was not properly directed, or if so directed, not strengthened sufficiently to resist the increasing tendencies of the railroad world toward that species of deception which underlies the present stagnation in railroad business—deception which bears on its current millions of dollars from the pockets of railroad investors.

In case any of my views about the form of price-list were adopted, I left the allied questions, as suggested above, to the Committee of Revision, who were prevented, it seems, from fully considering the changes made necessary by their action. Had I taken up that subject, I should, perhaps, have said something about changing the form of bill so as to give fuller information about the axles, a matter upon which a thought never seems to be bestowed. And yet, under the new rules, there are such items of charge as "new," "second-hand," and "scrap" axles.

The language employed in the new price-list is still unfortunately wanting in clearness of meaning. When new Rule 9 says, "and in accordance with the following rates for labor," we are uncertain whether other things are or are not considered—whether the rates of labor should be deducted from the one price given in the case of credit, or added on in case of charge. The fact of not expressly referring to the change made, in the old way, would favor the former view; but then, it will be observed, the prices given are in accordance with the market rates of the new and scrap material.

Then if, as the *Railroad Gazette* seems to think, the new Rule 9 was drawn up in accordance with my suggestions in a letter in the issue of June 5, the words there used, in place of those above quoted, are, "Add to the above the following charges, for turning, boring, pressing and replacing."

The writer's idea in having separate charges for shop labor (and by shop labor is meant, here and elsewhere in this letter, turning, boring, pressing and replacing) was, to save the necessity of having two price-lists, one for the credits and the other for the charges.

The present prices, as shown in the body of the list, are really credit prices, which become charging prices by adding to them the shop labor.

Two second-hand wheels, if sold at the foundry, would be

likely to bring the same rate per pound, but let us suppose ourselves removing one of them from a car and inserting the other in its place: the latter is made more valuable by the amount of shop labor expended on it.

Take away this shop labor, which is distinct and separate from any intrinsic value in the wheels and axles themselves, and the second-hand wheel removed and the one inserted are of the same value, as far as it can be definitely determined.

There are reasons, which will suggest themselves to accountants, why the shop labor should not be included in the one price given; but if included, the amount should be known, as now under the rules, so that proper credit may be given.

This brings me to consider the inference drawn by the *Railroad Gazette*, that an additional charge should not be made in the case of second-hand wheels and axles except when they are re-bored and re-turned.

It is too bad that exceptions should be introduced where there is no need to do so. I do not believe that the Committee of Revision intended anything else than that the labor charges should be made in the case of second-hand wheels and axles as well as new.

I think it will be found in practice that it rarely happens that a second-hand axle has not to be re-turned before being used again. The frequency of the cases where axles have to be re-turned, as against the cases where they are not, justifies our uniform rule.

Then certainly in every case labor is employed in inserting second-hand wheels and axles under cars.

I think the *Gazette* lost sight for the moment of the fact that the prices given in the body of the price-list represent the actual values of the wheels and axles in the open market, or before removal from cars. This is an important matter, and I hope the *Gazette* will make further inquiries into it.

If the subject was brought up in committee and decided as the *Gazette* infers, that settles it; but until it is positively stated, I shall conclude that the shop labor as per new Rule 9 should be charged for second-hand work also.

I hope it will be generally looked at in that way, as I believe I have shown that any other conclusion would be unreasonable.

In respect to changing the form of bill to meet the information required under the new rules as to axles, I think, if we give up about the lower half of the present form, writing under "wheels received" the words "axles received," we have all the necessary details, barring some to give information as to the make and quality of the wheels and axles furnished as well as removed, as suggested by the *Railroad Gazette*; which rarely touches that it does not improve, as in the present instance.

I like your correspondent's idea about publishing some illustrative examples with a view to a better understanding of the changes that have been made in the rule. As I was one to advocate those changes, I hope it will not seem presumptuous in me to bring forward a few examples.

We will suppose a case where we removed—

- 1st. 1 pair 33-in. second-hand wheels on second-hand axles.
- 2d. 1 pair 33-in. second-hand wheels on scrap axles.
- 3d. 1 pair 33-in. scrap wheels on scrap axles.

Inserting in their places—

- 1st. 1 pair 33-in. new wheels on new axles.
- 2d. 1 pair 33-in. second-hand wheels on second-hand axles.
- 3d. 1 pair 33-in. new wheels on second-hand axles.

Dr. Form of Bill with Extensions, as per Rule No. 9.

To 1 pair 33-in. new wheels on new axles	\$34.90
To 1 pair 33-in. second-hand wheels on second-hand axles*	24.00
To 1 pair 33-in. new wheels on second-hand axles*	30.90
	\$90.70

Or.

By 1 pair 33-in. second-hand wheels on second-hand axles	\$23.00
By 1 pair 33-in. second-hand wheels on scrap axles	20.00
By 1 pair 33-in. scrap wheels on scrap axles	14.00
	\$57.00

* Full charges for shop labor.

M. C. B.

["M. C. B.'s" uncertainty, in the first part of his letter, as to whether "the following rates for labor" were to be added to the charges for material furnished or deducted from "the one price given, in the case of credit," ought not, it would seem, to puzzle him long. It is a well-established and universal principle of modern business book-keeping that everything furnished (or sold) should be charged at its full cash value, and everything received (or in effect bought) should in like manner be credited at its full cash value. This method "M. C. B." has followed in the account above, and it seems clear that it is the only correct one.

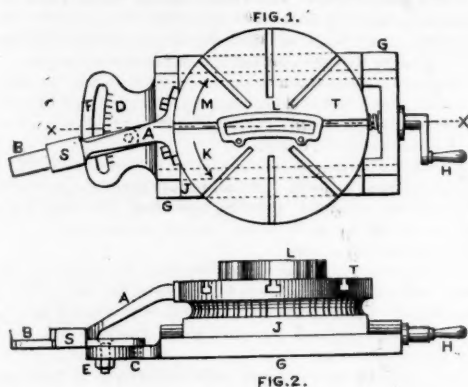
The expression "boring and fitting wheels, each 50 cents," implies clearly that every wheel furnished, new or second-hand, may have that much added to its list price, as given in the table above, since whether a second-hand wheel be re-bored or not, it is necessarily re-fitted. Whether a man has a right also to charge 40 cents each for re-turning a second-hand axle, whether he actually re-turns it or not, might, under the letter of the rule, be an open question, but it tends to simplicity to make the charge in all cases, and if some do, all ought to. We, therefore, apprehend that that will be the rule, as "M. C. B." suggests, although "constructive" turning, like constructive mileage, has its objectionable side.—EDITOR RAILROAD GAZETTE.]

Slotting the Links for Link Motions.

LONDON, England.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I find in use here an excellent device, or rather an attachment to a slotting machine, for slotting links for link motions to the correct curve, using the self-acting feed, as is necessary to the production of true and smooth work. The principle involved in the action of this device might, it seems to me,



Device for Slotting Link-Motion Links on a Slotting Machine.

be employed to advantage in planing-machine chucks, and I should not be surprised to find various other adaptations of it. It possesses the advantage that curves of a great radius may be dressed without the radius bar being of full length, and floor space is thereby greatly economized. Another advantage is that the direction of the curve of the work may be reversed; that is to say, it is possible to slot out on a round and a hollow sweep without unchucking the work. Indeed, let the outline of the work be what it may, so long as it is composed of axes of circles and straight lines, it can be done and finished using the ordinary self-acting feed of the machine, all that is necessary being to set the device for each curve.

Fig. 1 gives a plan and fig. 2 a side elevation of the device. *G* is the ordinary cross slide and *T* the work-holding table of an ordinary slotting machine, *L* representing a link motion in position on the table. (The feed gears are not shown, because they are not necessary to this description.) *A* is an arm attached to the rim of the table *T* and having at its end *S* a gibbed head for sliding along the bar *B*. This bar is pivoted at *C* in the piece *D*, and is secured in its adjusted position by a bolt and nut *E*, passing through the slot *F*.

The operation is as follows: Suppose bar *B* to be secured in the position it occupies in the engravings, and that the worm for the worm gear of the work-table is thrown out of gear, leaving that table free to revolve. Then if the cross feed screw whose handle is shown at *H* be operated, the slide *J* will traverse in the usual way, but the motion of the head *S* along bar *B* will cause the work-table *T* to revolve upon its axis, because of the bar *B* being at an angle to the line of motion of the slide *J*. This will obviously cause the work to be cut to an arc of a circle whose radius will depend upon the angle at which the bar *B* is set to the line of motion *XX* of the slide *J*. The upper face of *D* is marked for the various radii of curvature usually required for link motions.

When the bar *B* is on the side of *X* that it is shown to occupy in the engraving, the direction of revolution of the table is as denoted by the arrow *K*, whereas when *B* is moved over to the other side of *X*, the direction of table revolution will be as denoted by arrow *M*, and this it is that enables the slotting of reverse curves. When bar *B* is not in line with *X*, the device is thrown out of action altogether.

I closely examined several sets of links that had been finished by this device, and I may say that I never saw any better or smoother work. It was water finished, bright, smooth and clean, and equal to the best of planed work.

The links can be finished both inside and out without ever being unchucked, the clamping or chucking plates being merely moved from the outside to the inside, or vice versa, of the link, without moving it.

The advantage of this system is greatly augmented from the fact that nearly all English links are forged solid and not bolted together, and it would, therefore, be impossible to place them from end to end in the slot, as there must be at one end a space cut out to receive the tool and at the other a space to receive the tool point, which would break if it reversed without the cutting being completely cleared. There is more work in making a link in parts than a solid one, on account of the number of pieces. Thus we have the two halves, the two end-blocks and the bolts and nuts. In repairing, however, the built-up link is probably the cheapest, as the two halves can be let together to take up the wear, instead of having to put a new link block in.

It is easier, however, to fit a new link block in than it is to let the two halves together, if a nice fit is to be obtained, and with the new block the old pin may very often be used again at times, when if the old block is used a new pin must be had. The English method of hanging the link is also a point in favor of finishing it under a slotting machine, as the outer curve is continuous from end to end of the link, whereas in American practice there is a projection to receive the bracket or saddle. Obviously, however, the built-up link may be got up on a slotting machine having the device shown in the engraving, and the device possesses the additional advantage that, while there is usually enough work and to spare for the

planing machine, the slotting machine often has to stand idlet and anything that increases its usefulness is advantageous, especially when it relieves the planer.

JOSHUA ROSE, M. E.

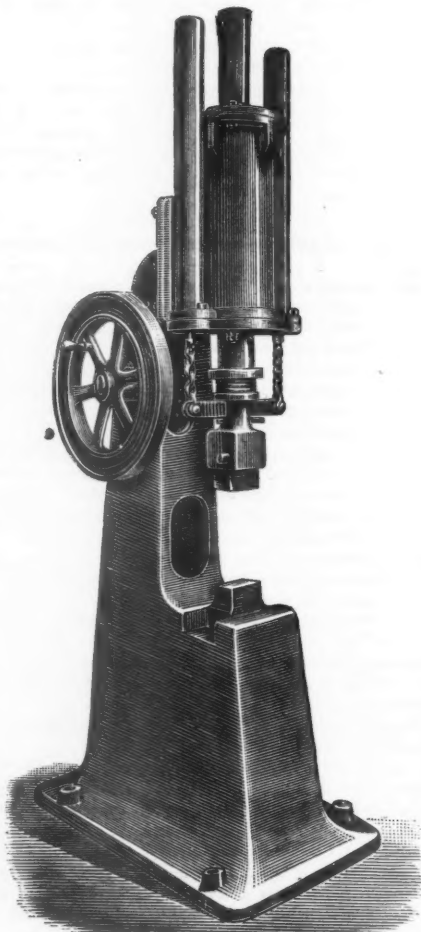
Robson's Gas Hammer.

A form of engine which operates by the explosive power of a gas within it seems especially suitable to operate a "steam" hammer, but the one illustrated, recently brought out by the firm of Tange Brothers, of England, seems to be the first attempt to utilize this natural fitness. It is deemed especially suitable for the lighter kinds of hammers, and only such have been as yet brought out. *Engineering*, to which we are much indebted for our engraving, describes it as follows:

It is arranged much on the same principle as an ordinary steam-forging hammer, although of course it differs entirely in detail, the blow being given by the explosive force of gas in place of steam. The cylinder is placed over the anvil in the manner shown, and in it are two pistons, one above the other. Attached to the lower one is the piston-rod, which has fastened to it the trip. On each side of the cylinder there is a strong spiral spring inclosed in a suitable casing, and attached to the hammer by means of links connected to a cross-head. The reaction of the springs draws the hammer upward to the top of its stroke, when the lower piston will be about in the middle of the cylinder. The top, or charging piston, works in the top half of the cylinder.

To start the hammer a turn of the fly-wheel is made by hand, by a handle provided for the purpose. This raises the top piston and a charge of air and gas is drawn into the cylinder between the two pistons. When near the top of the stroke the mixture is exploded by the usual means and the hammer driven down. After the first blow, the action is carried on automatically. The admission valve for the gas is worked by a cam motion taken from the fly-wheel shaft, and the exhaust port is opened by means of a crank on the fly-wheel shaft, which works a lever. The force of the blow is regulated by adjusting the admission valve to give a greater or less quantity of gas.

The hammer exhibited is a $\frac{3}{4}$ cwt. size, and will strike a



ROBSON'S GAS HAMMER.

blow equal to a $\frac{3}{4}$ cwt. steam hammer. It is said to be extremely economical in its use of gas, a foot or two being sufficient for an ordinary forging. One of its chief merits is that it is always ready without preparation, and may be used for striking even a single blow.

The Manufacture of Steel Tires.

At the January meeting of the New England Railroad Club some interesting data as to the manufacture of steel tires were presented in letters from the Midvale and the Standard Steel Works, and from Thomas Prosser & Son, agents in this country for Krupp's works, from which we extract and condense as follows:

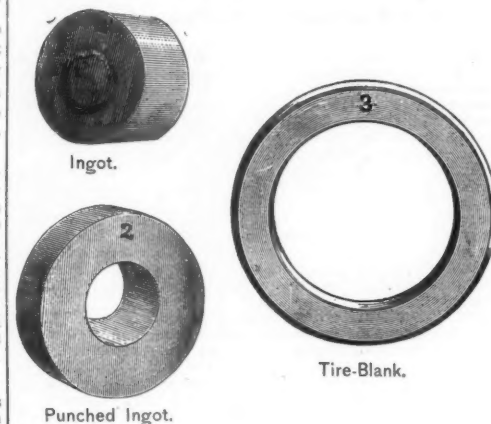
The process, as described by the Midvale Steel Works, consists in casting solid steel ingots of cylindrical shape, say from 12 in. to 15 in. diameter, and from 10 in. to 18 in. high, according to the weight of tire to be made. These ingots, after heating, are upset longitudinally under a hammer and a hole is punched in the centre forming what is known as a "punched bloom."

This bloom is dropped on a horn or beak projecting from the side of the anvil, and by blows of the hammer is enlarged in diameter, and at the same time the flange both out and in

side is roughly formed. The resulting piece is called a "beaked bloom." The beaked bloom is then rolled on a tire-mill to an exact outside diameter and almost perfectly round.

These operations, in the case of ordinary tires without inside flanges, present no great difficulty; but the forming of a high narrow flange, such as is used for the Allen paper car wheel, and others requiring an inside flange, considerably complicates the manufacture.

After specifying the care used by them in making physical



and chemical tests, and in keeping individual records by number of each tire, the Midvale Co. continues:

The wear of tires is caused by two kinds of friction—rolling and rubbing. It has been maintained by some authorities that, especially in the case of rails, a mild steel may show a greater resistance to wear from rolling friction than a harder one. This may be the case with tires when the load carried by the wheel is not so great as to cause the metal to flow to the edge of the tire, forming the projecting burr which is so often noticed on the driving wheels of heavy locomotives. However that may be, it can, we think, be admitted, without question, that a hard material offers a greater resistance to rubbing friction than a soft one. Car-wheel tires are subjected to constant rubbing friction from the effects of the brakes on every wheel, and from the skidding of the wheels on the rails; and it would therefore appear that a hard steel should be used to give a tire satisfactory wearing qualities.

The use of a hard steel will, of course, increase the chances of breakage; and this must and can be guarded against by the quality of the metal—i. e., the quality of the stock used—and the care exercised in the manufacture. The steel which the Midvale Co. puts into car-wheel tires will show, in a bar hammered or rolled to 1 in. square, a tensile strength of 125,000 to 135,000 lbs. to the square inch, and an elongation of from 8 to 10 per cent. in a length of eight diameters. Specimens $\frac{1}{2}$ in. diameter and 2 in. long between shoulders, machined out from the body of the tire in a direction tangential to the circumference, will show approximately the same results. Physical qualities, such as the above, certainly insure hardness and consequent good wearing properties; and experience at Midvale indicates that the quality of this metal is such that it can be used with safety.

As to the ultimate economy of the general use of steel-tired car wheels, we think there can be no doubt. What is wanted is a cheap, reliable and durable centre which can outwear a number of tires, and which should be provided with a simple and effective means of holding the tire on in case of breakage. A tire $2\frac{1}{2}$ in. thick made of the metal above described should, under ordinary circumstances, make a mileage of at least 400,000 miles, and if a centre were used which would outwear three or four such tires, and which would allow of the tire being easily and rapidly replaced, the cost of the centre would in the long run be comparatively insignificant, and the general use of such a steel-tired wheel, both for passenger and freight car service, would, we think, be found advantageous, both as regards cost and safety.

The Standard Steel Works describe the process, with illustrations, as follows:

In regard to the manufacture of the tires, all the members of the club may not be aware that they are made from a solid cylindrical-shaped ingot, as is shown in the figure marked 1 in accompanying cut. This cast ingot is first thoroughly hammered on face and edge under a powerful double-acting steam hammer, taking live steam above and below, the drop of which weighs 26,000 lbs., under which it is also punched, being in the shape shown in fig. 2 when it leaves the hammer. From this shape it is beaked on the horn of the anvil into the tire blank, fig. 3, which is really a forged tire with metal enough to allow for rolling to size wanted. This is taken to the heating furnace at the mill and then rolled to the dimensions specified. The accompanying photograph of the mill will give an idea of the method of rolling; the roll inside the tire being the pressure roll, which, by hydraulic pressure, forces the tire against the main roll until the required thickness is obtained. The two side rolls are simply guide rolls preserving the roundness of the tire. The process of manufacture, it will be understood, produces a continuous solid ring of steel without weld or joint of any sort.

The method of applying the tires to the different makes of wheels varies with each wheel, and in fact constitutes the difference between them. Undoubtedly the wheel makers will present the claims of their wheels to the club, and will explain the application of the tires much more clearly than we could.

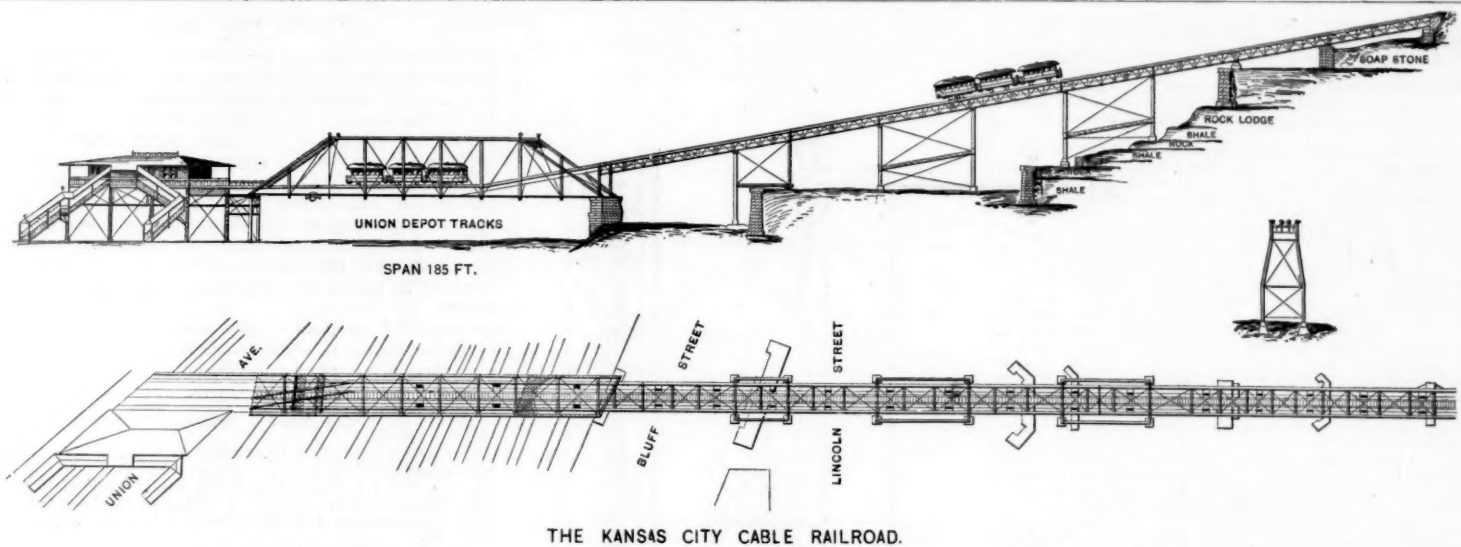
In regard to the question about the hardness of the steel, the grade of steel which has been adopted for driving wheel tires is that which the results of service and a proper regard for safety have shown to be best, and this method of determination is the one which should govern the selection of steel for car wheels, the difference in diameters, of course, insuring a greater safety in the use of hard steel in car-wheel tires.

As the comparative durability and strength of cast-iron and steel-tired wheels can only be determined by actual test in service, we feel that the gentlemen having the mileage records in charge are the ones best prepared to speak on that subject.

In the manufacture of tires, the preparation of the bloom for rolling is the most important part, viz.: The hammering from the ingot to the bloom. The rolling is simple and only requires such a mill as shown, driven by powerful engines. The mill shown is a common, but not the very latest type.

Messrs. Thomas Prosser & Son, agents for the famous Krupp works, say:

As you are aware, two qualities of steel are generally used



THE KANSAS CITY CABLE RAILROAD.

for car-wheel tires, viz., crucible and open hearth; the former being melted in small crucibles containing about 70 lbs. each, while the latter is made in large masses in the Siemens-Martin furnace.

After considerable experimenting and study on the subject, Mr. Krupp finds that one of the essential features of a car-wheel tire is that it shall be hard and tough, and he has settled on formulas which he considers produce the best crucible and open-hearth material for the purpose. All car-wheel tires furnished by him are made to these formulas, so that those of a given quality are necessarily of the same degree of hardness, regardless of what may be the material of car-wheel centre.

As regards the application of the tire to the several kinds of wheel centres before the public, Mr. Krupp is of the opinion that in some cases the method employed is very injurious to the tire, especially in the case of a connection being accomplished by casting an iron centre into the tire, thereby destroying certain properties of the tire, and for this reason he has declined to furnish tires to be attached to centres in this way.

As regards the relative strength of steel-tired and chilled iron wheels, much, of course, depends on the quality of both. The tensile strain, however, of Krupp's crucible tire is about 130,000, and his open hearth about 85,000, while the tensile strain of many of the chilled wheels running is no doubt an unknown quantity, owing to the vast number of so-called "cheap" wheels that have been put in service, but if we give them the benefit of the doubt, and call the U. S. Standard 20,000 lbs. per sq. in. tensile strength, that strength in our estimation demonstrates that the chilled wheel is a very dangerous article to put under the average passenger car of to-day (it might have been different 10 years ago with the light cars), owing to the fact that they are not suitable to carry the vast weight above their capacity that they now do; it having been pretty well demonstrated that, under heavy cars, the chilled wheels are not worn out in the literal sense, but are "crushed" out of service.

The Kansas City Cable Railroad.

Few cities have had to contend with such topographical difficulties in the effort to get reasonable gradients for its streets as Kansas City, Mo., and few or perhaps none have ever gone to such enormous expense in proportion to their means for the purpose of smoothing off natural irregularities. Without grading down the whole city some 200 ft., however, it was not possible to avoid excessive grades on the most used thoroughfare of all, that descending from the city proper to the railroad yards and manufacturing works of the flat below, and many of the thoroughfares of the city proper were inconveniently steep. The cable system, therefore, was peculiarly adapted to the necessities of the situation, and one presenting some interesting features has recently been constructed of which we illustrate the most striking feature, the descent from the bluffs.

The incline down the bluff is a grade of 18.3 in 100 and descends from an elevation of 191 ft. to the centre of the main span (185 ft.) across the yards of the Union Depot. The iron work consists of eleven spans of the following lengths, beginning at the bottom: 65, 185, 67, 29, 45, 46, 47, 46, 46, 47 and 47 ft.

At the end of the last span the cable leaves the open work of the viaduct and enters a concrete subway below the street.

This cable road is peculiar in having a duplicate cable, so that repairs or renewals can be made without any interruption of travel. In fact it has a duplication of machinery along the whole line, so that if an accident occurs it can be remedied without loss of time. There are two carrying pulleys side by side to support the cables in every pulley-pit, the pulleys being 35 ft. apart longitudinally. At the extreme ends of the railway, where in the ordinary cable road there is one sheave 12 ft. in diameter, in the Kansas City road there are two. In the engine-house also there are two independent engines and two sets of driving machinery complete. No other plant in the United States makes these provisions.

Some serious engineering difficulties presented themselves, one of the most serious of which was at the foot of the bluffs. In locating the foundations for the wrought iron supports for the viaduct the discovery was made that a local movement in the limestone ledge was taking place. When the large mass of loose earth and rock at the base of the bluff had been removed, the limestone ledge in question was exposed and it was found that a stratum of soapstone and bituminous shale 18 ft. in depth was rapidly crumbling and allowing the limestone above to descend. The remedy applied

to this annoying difficulty was ingenious and interesting. The rock ledge was first thoroughly cleaned of all extraneous material and then its cracks and fissures were filled with a liquid cement grout made from German Portland cement. The water and moisture which had served the purpose of a lubricant, and thus caused the "crumbling," was by this means excluded, and the cause being removed, the evil effect ceased.

The sewers encountered also caused much difficulty, so that the simplest remedy was found to be to build a new sewer under the track for almost its entire length, and let the city sewers encountered at each street crossing run into it.

The cable is $1\frac{1}{2}$ in. diameter, of Swedish iron wire, capable of resisting a strain of 30 tons. The total length of both cables is 44,000 ft., and it is expected that they will have to be replaced every eighteen months of continuous service. The weight of both cables is about 56 tons.

Although the changes of grade are unusually sharp and frequent, the natural sag of the cable is sufficient to hold it down upon the pulleys except at two or three points, where sharp depressions occur. At these points depression-pulleys are placed which hold the cable down, and when the grip passes the cable is pressed down 6 in. below these pulleys; thus the grip avoids contact with them. The weight of the cable itself is $2\frac{1}{2}$ lbs. per lineal foot, which with the ordinary tension and an average number of grips with their loaded cars attached by it, causes a deflection between the carrying-pulleys, 35 ft. apart, of about 2 in. The average tension on the cable required to barely do the work is about 4 tons, the cable leaving the engine-house with a strain of about 1 ton and returning to it with about 5 tons.

The total length of the road is now $2\frac{1}{4}$ miles; but it is expected to extend it one mile eastward on Independence avenue, and still another mile on Ninth street the present summer. An extension to and into the city of Wyandotte, Kan., across the Kansas River, is also contemplated.

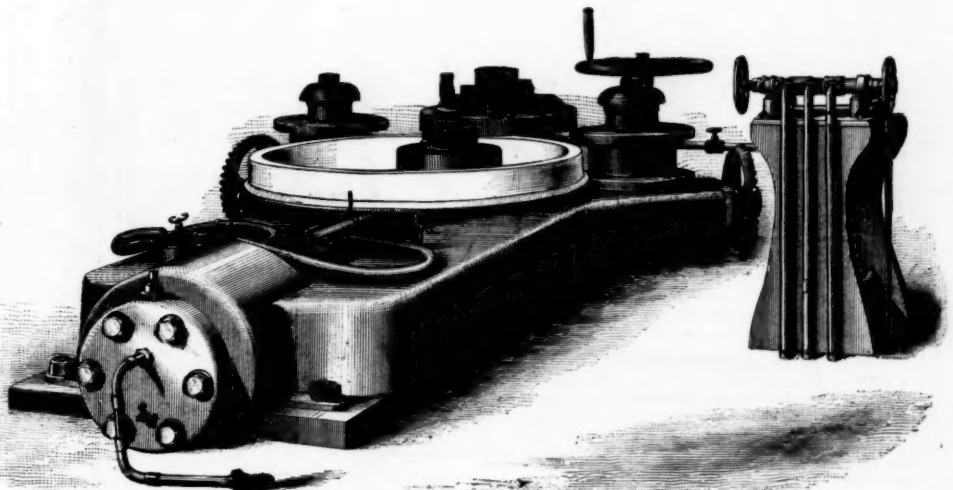
The maximum grades on the several cable railroads of the

600 horse-power, which is considered amply sufficient for all demands.

The grip attachment is operated from the end of the car instead of the centre (as in all other lines), and the passengers are thus no longer interfered with and discommoded, while the carrying capacity is increased. It consists of three parts: the upper or crank, the middle or shank and the lower or jaws. The crank and shaft giving motion to the jaw of the grip are connected at one side with the levers of the grip wheel in the cab, and also connected with the central and moving part of the shank, which has a vertical motion. The moving part of the shank is also connected with the movable and horizontal upper jaw of the grip. The shank is made from rolled-steel, and the jaw of cast-steel lined with brass, reducing the wear on the cable to a minimum. The lower jaw of the grip is stationary, having two rollers placed vertically at each end of the jaw.

When it is desired to start a car, the grip-wheel in the cab is turned to the right, which forces the movable upper jaw (17 in. long) down on the cable resting on and rolling over the pulleys in the lower jaw of the grip. The pressure forces the rollers down a limited distance with the cable, as they are supported by flexible journals; the brass in the grip takes hold of the cable under the pressure of the grip-wheel and the car moves. If it is desired to stop the car, the grip wheel is turned to the left, thus raising the movable upper jaw from the cable. The pressure being released, the small pulleys in the lower jaw spring upward slightly and support the moving cable. It does not matter how often stops are made, the cable never leaves its position between the grip's jaws—it is either gripped by the jaws or riding on the pulleys in the lower jaw. It is, however, conducted out of the grip when it is necessary to change the car from one track to another, and in passing over the vault on the south track at the engine house. The cars are carried over this distance, which amounts to 40 ft., by momentum acquired before reaching the vault. This occurs on the south track only.

Mr. Robert Gillham was Chief Engineer of the road, and Mr. Victor Spangberg First Assistant Engineer.



TIRE ROLLING MILL.

country compare as follows, that on the Kansas City line being the heaviest:

Clay st., San Francisco, 16 in 100.
California st., San Francisco, 18 in 100.
Suter st., San Francisco, 8.7 in 100.
Geary st., San Francisco, 9.8 in 100.
Ninth st., Kansas City, 18.3 in 100.
State st., Chicago, about level.

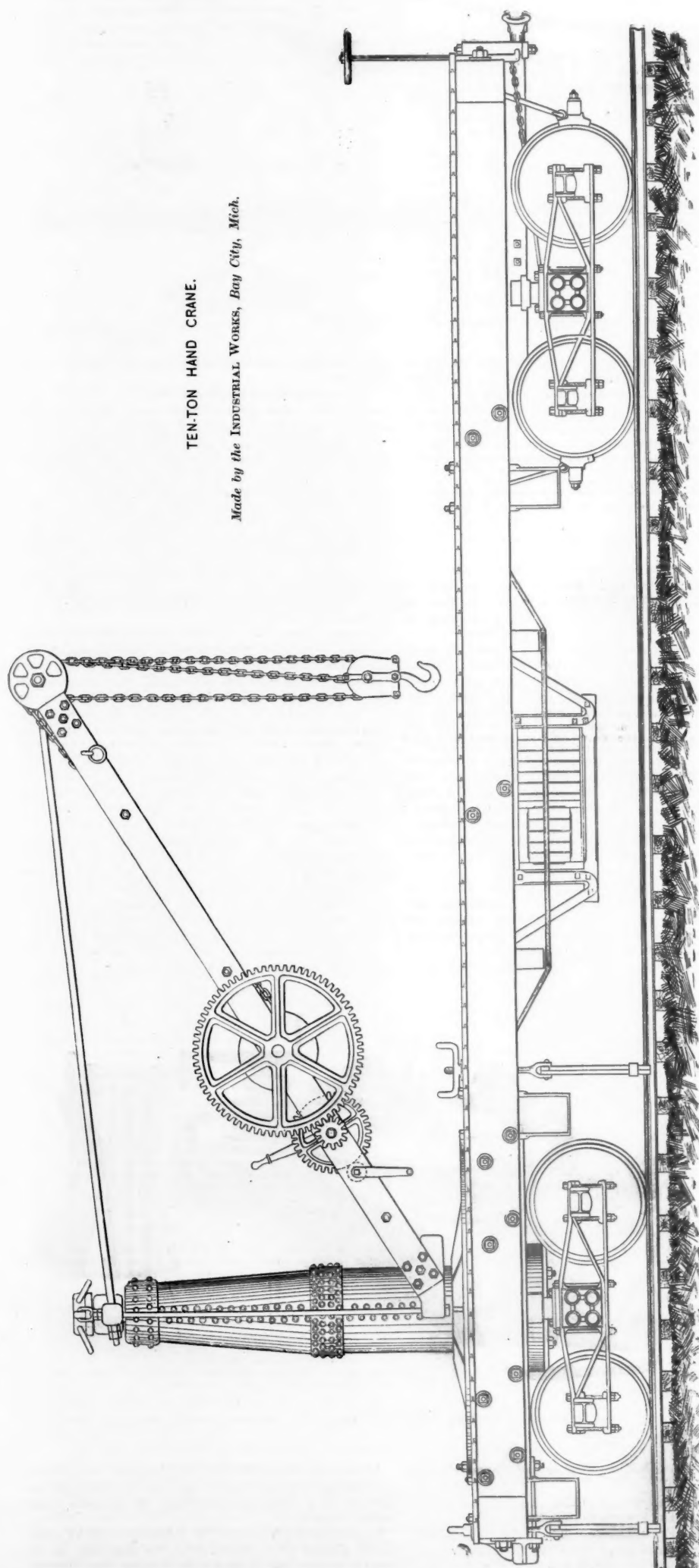
The engine house is a substantial brick structure of two and one-half stories, 90 x 144 ft. The total boiler capacity is

A road somewhat similar to the one described, but differing in important respects, is now in process of construction at Hoboken, N. J., to ascend to the bluffs (the Palisade ridge) back of the city.

We are indebted for most of the information above given to the *Kansas City Commercial*. We may note in the same connection that the issue of the *Mining and Scientific Press*, of San Francisco, for July 18, is a 32-page "cable railway edition," full of detailed information in regard to the practical working of such lines.

TEN-TON HAND CRANE.

Made by the INDUSTRIAL WORKS, Bay City, Mich.



Ten-Ton Hand Crane.

The crane or wrecking car illustrated is one of a number of patterns manufactured by the Industrial Works of Bay City, Mich., and is one which the makers deem the best of all their hand crane designs. It is in use on the Michigan Central, the Detroit, Mackinac & Marquette, the Minneapolis & St. Louis, the Beech Creek, Clearfield & Southwestern and a number of other lines. The price complete is about \$1,500. The company manufactures lighter cranes also, and on the other hand manufactures a much more powerful steam crane, illustrated in the *Railroad Gazette* for Aug. 1, 1884, and in the *Car-Builders' Dictionary*, page E 17, which is calculated to handle the largest cars and locomotives, and costs about \$8,000.

The makers' specification and description of the work for the car illustrated, slightly abridged, are as follows, and renders further description unnecessary:

SPECIFICATIONS.

Length over all outside of planking, 35 ft. 3 in.; width over all, 10 ft.

Frame.—Entire car body, white oak; outside and intermediate sills, $5\frac{1}{2}$ x 14 in. x 34 ft. 1 in. End sills, $5\frac{1}{2}$ x 14 in. x 9 ft. 9 in., securely fastened to sills by joint bolts. Longitudinal timbers receive at distances specified, transverse oak pieces $5\frac{1}{2}$ x 14 in., framed in $\frac{1}{4}$ in. at each end into sills.

Tie-bolts.—Car to be secured by tie-bolts 1 in. diameter, with wrought-iron washers $\frac{3}{8}$ in. thick.

Buffer timbers, of oak 6 x 12 in.; back end held in position by iron bracket and through bolts. Forward end held in position by bolts passing through buffer-block and timbers, and through a wrought-iron plate passing across under both timbers. Bolts to have double nut and all to be keyed.

Buffer block of oak 5 x 18 in. x 2 ft. 6 in. and securely bolted to end-sills.

Draw-bar, extra heavy and of cast-iron, with openings and fastenings to correspond.

Forward buffer casting, secured by four bolts, as shown; the two upper $1\frac{1}{2}$ in. diameter, to pass through end-sill and supplied with heavy cast washers; the two lower $1\frac{1}{2}$ in. diameter, and to receive the $1\frac{1}{2}$ in. plate bolts.

Needle-beams, 6 x 8 in. oak, bolted through each sill, and a casting on under side for truss-rod saddle.

Truss rods of $1\frac{1}{4}$ in. round iron, with enlargement to $1\frac{1}{2}$ in. diameter at each end for screw threads. They are to pass under the saddles, secured to under side of needle-beams, and over and supported by a wrought-iron strap 4 x 1 in., passing across and bolted to each sill; thence passing through end-sill, and a cast washer 6 in. diameter.

Brakes supplied for rear truck and hung to body.

Trucks of the best quality of iron and of standard pattern of sufficient bracing and strength to carry safely, in addition to car, 40,000 lbs.

Corner plates of $\frac{1}{4}$ in. wire, lapping 12 in. on either side. **Planking** of 2-in. oak, each plank of full length, tongued and grooved and securely nailed.

Tool box of oak, with wrought iron straps, $\frac{1}{2}$ by $2\frac{1}{2}$ in. **Painting** to be of deep red color and lettering as directed.

IRON WORK.

The mast is constructed of the best $\frac{3}{8}$ -in. plate steel, curved to the proper diameter and united by a $\frac{3}{8}$ -in. double riveted fish-plate. So constructed, it is light and very strong. Two heavy castings 8 ft. in diameter, let into the sills and tied to them by forty-eight $1\frac{1}{4}$ -in. bolts, receive the mast.

These plates and mast rest directly on the truck, thereby enabling the jib by its forward position to be effective either directly in front or on the side.

The jib is constructed of two Carnegie's (No. 33) 9 in. heavy channel bars, securely braced to resist flexure. These channels fit into a head and a shoe casting, the inside of the latter being supplied with friction rollers, enabling a minimum of power to be used in slewing.

The gearing is of Salisbury iron, the shafts of hammered iron. By the use of a large drum and a liberal amount of chain, loads may be handled at a distance of 20 ft. from the car.

The stability of the car is insured by the use of six white-oak spring-beams, placed as shown, and further stability is secured by wrought-iron track clamps, and by guy chains attached to the top of the mast.

Light loads may be hoisted quickly and safely by placing the handles on the forward shaft, and absolute safety to attendants is secured by the use of an eccentric friction brake, by which, in case of any breakage, the load is held suspended independent of the connecting gearing.

For purposes of construction and car lifting, a variety of tools are furnished; stone-tongs, timber-hooks and freight-hooks. For car-lifting a needle-beam, bound with iron, and supplied with grab-chains for attaching to cars, is made, and found to be of great service by many roads.

If so desired, a similar mast and crane may be placed over the rear truck, thus giving a pair of cranes whose combined power can lift the heaviest weights.

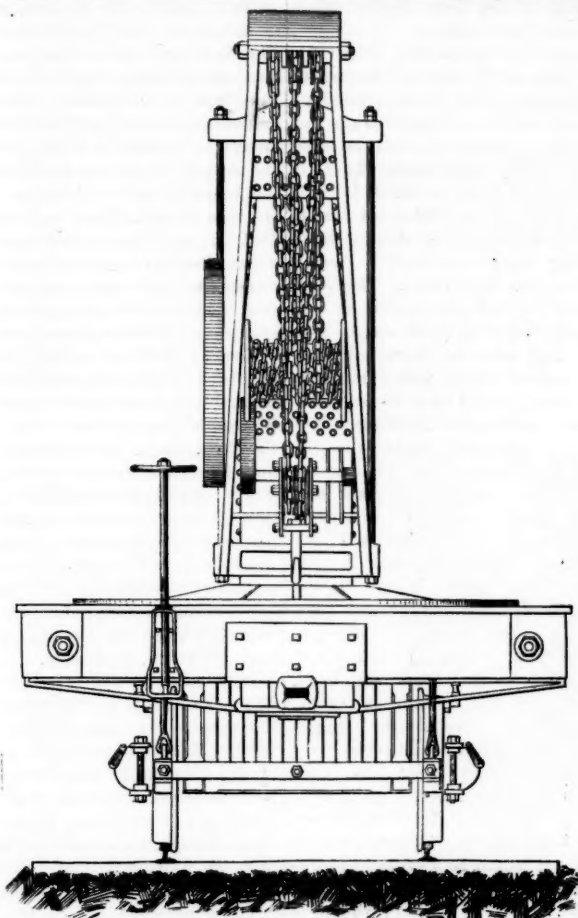
THE SCRAP HEAP.

The "Novelties" Exhibition.

The venerable, yet actively progressive, Franklin Institute intends not only to keep up with the rapid march of improvements and discoveries in the arts and sciences, but to act as guide through the intricate and rapidly developing realms of invention. The title, "Novelties Exhibition," is not only attractive, but expressive as giving large scope to the imagination, stimulating curiosity and exciting expectation that here will be found a panoramic view of the latest discoveries and inventions comprised within the circle of the arts. The list of novel exhibits already entered is a long one, and while very comprehensive in its scope, shows that careful discrimination has been exercised in its selection in order to avoid the common error of admitting exhibits devoid of genuine merit. One of the interesting features of the Exhibition is to be the improved systems of gas-lighting, in which great strides have been made since the advent of its formidable rival, the incandescent electric light. The Siemens regenerative system of heating the gas before it reaches the burner, and thus increasing the light, will be shown—a system which is making a favorable record for itself in Europe and in this country, not only from an economic but also from a hygienic point of view, since means are provided for carrying off the injurious products of combustion, and also of ventilating the room.

The Albo-carbon gaslight will also be shown. This system presents a novel method of enriching ordinary coal gas by the use of naphthaline, a hydro-carbon which is produced in large quantities as a by-product in the manufacture of coal gas. The material in question is a solid substance, a small quantity of which is taken up by the gas and decidedly increases the whiteness of the light.

The various ingenious devices for minimizing household labor will doubtless attract all womankind, while the



TEN-TON HAND CRANE.

Made by INDUSTRIAL WORKS, Bay City, Mich.

mechanical and electrical toys will afford a fund of pleasure to the juveniles, and even to the children of a larger growth.

More strictly utilitarian are the exhibits of rustless iron and steel, which are to be made by the Bower-Barff Co. The result affirmed to be obtained by the treatment to which this company subjects iron and steel is, that such articles are covered with a firmly adherent tenacious film, or skin, of magnetic oxide of iron, which, for all practical purposes, is unalterable by exposure to atmospheric changes. It is claimed to be of the greatest utility as a method of protecting bridge and other iron structures; in fact, iron articles of every description which require to be exposed to the weather. The process comes to this country from England, where it has received much favorable comment. What is above mentioned is set forth simply as indicative of the nature of exhibits comprised within a "Novelties Exhibition." The electric toothbrush proprietor, and the vendors of quack notions, will find a great novelty in this exhibition, viz., that their fancy wares will be rigidly excluded by the censors. —Philadelphia Ledger.

Fast Time.

Since the through trains have commenced running between Chicago and Nashville, the running time has materially been shortened. The Chicago & Nashville express, as the new through train is called, consists of a baggage car, one coach and a sleeper, the same number of cars as the Vandalia and the Indianapolis & St. Louis, limiteds. The Chicago & Eastern Illinois and the Evansville & Terre Haute both boast of having an excellent track and every facility for making fast time. The north-bound C. & N. express yesterday morning made several bursts of speed. The 100 miles between Evansville and this city were run in 2 hours and 30 minutes, including five stops. The first five miles out of Evansville were run in 7 minutes. From Engles to Haubstadt was run at the rate of a mile a minute. From the last named place to Fort Branch, a distance of 7 miles, was run in 6½ minutes. William Kerlin was the engineer, the engine being No. 21. The south-bound train Sunday morning also made an excellent record. At times the speed of the train considerably exceeded a mile a minute. From Patoka to Evansville, 31 miles, the time was 44 minutes, and with three stops. From Fort Branch the run to Evansville, a distance of 20 miles, was made in 20 minutes with one stop. Conductor John Laugle was in charge of the train, with Bony Lyon at the throttle. —Terre Haute (Ind.) Express, July 23.

Fast Freight Time.

A dispatch from Chicago, July 19, says: "Last Sunday, at 2:35 p. m., 13 Union Pacific cars, loaded with tea, were started from Ogden eastward, and they reached Omaha on Tuesday, at 3 p. m., being just 46 hours and 35 minutes making the trip, and in this one hour must be allowed for the change in central and mountain time. The distance from Ogden to Omaha is 1,032 miles, an average of 22.7 miles an hour, without allowance for stops.

An Open Door Accident.

What might have proven a very serious accident occurred to Erie train 5 Friday night when the flyer was running at a high rate of speed near Greycourt. It was passing an eastward-bound freight train when the door of a box-car swung loose and came in contact with the side of a Pullman sleeper, smashing 18 windows. A passenger who was seated near one of the open windows received several cuts about the face and hands from the flying pieces of glass, but he was not seriously injured. The car was switched and the passengers in the damaged car were accommodated in other cars. —Port Jervis (N. Y.) Gazette, July 25.

A Runaway Accident.

A dispatch from Harrisburg, Pa., July 25, says: "There was a thrilling sensation at the Pennsylvania Railroad depot in this city yesterday afternoon. The second section of the day express had arrived from the West, and a large number of people were congregated at the station. Suddenly a cry was heard, consequent on the rapid approach of a train on

the same track containing the Thirteenth Regiment, from Scranton and the surrounding country. Soon after it struck an express car, which had been switched from the Philadelphia & Reading Railroad track, and demolished it. The train seemed to be beyond the control of the engineer, and people fled in wild confusion to avert a threatened catastrophe.

"The scene of the terror was indescribable. As the madly rushing train approached the Pennsylvania Railroad depot, it struck the rear Pullman of the day express, throwing the engine connected with the soldier train from the track, and sending the preceding train ahead 200 ft. The passengers on the latter train received a severe shaking up, and all the dishes in the dining car were broken. The Pullman struck by the runaway engine was considerably damaged and several platforms were damaged. Many of the soldiers, after the run-in, jumped out of the windows of cars, apprehensive of a more serious affair.

"The accident was caused by detachment of the air-brake from the engine of the train carrying the military, which prevented the engineer from controlling his locomotive. He stood to his post manfully until all danger of loss of life had passed."

In the Station.

A little incident occurred yesterday at the Pennsylvania Railroad station which made the passengers, conductors, brakemen, porters and everybody laugh heartily. An excursion train was just about to leave when a very fussy woman with a slow-going husband came through the gates. She was evidently the kind of a wife who did the talking for all the rest of the family.

She was surrounded by a dozen band-boxes it seemed, as she squeezed through the gate, nearly upsetting the man who tried to see her ticket to find out where she was going. She struck out ten feet ahead, and looking back cried out, "Now hurry up, Josiah."

Josiah was walking leisurely after her. She reached the car-steps about two rods ahead of him, and until he came up she indulged in excited gestures for him to hurry up.

"Now, you get on first, and take these things."

Josiah was about to step on, when she imagined she heard a bell ring somewhere, and thought the train was starting.

"No, let me on first; the train is going. It's going," and she pulled Josiah back, dropped her many bundles on the platform, hustled up on the step herself, and cried to Josiah,

"Hand me up those bundles, quick!"

"No, no; I mustn't stand on the platform; hand them in the window. Here, Josiah, here! here!"

By this time she had run into the car, and her "Here! here!" came from the window half way down the side of the car.

Josiah meekly bestirred himself in that direction, dragging the bundles with him, and the train meanwhile never budged.

"Here, hand me the band-box first, Josiah." The band-box went slowly up to the window until it got within her reach, and then it was on the seat beside her in a twinkling, and the hat of the gentleman sitting in the next seat was lying on the floor. Before Josiah could stoop to pick up another bundle to pass in the window she was stretching away out and calling:

"Now, that one there, Josiah; the one with the doll-baby in it." In it went to the window. "Now my ulster, Josiah, and my hat," calling for three things before Josiah could hand her one. Each time a bundle came in she got up to set it down on the seat, and then when they were all in she set them all down on the floor and rearranged them on the seat in a pile around her, and concluded by sitting down with a rush in a vacant spot made for herself, all the time gabbling on to Josiah.

"Josiah, see how soon the train starts. There, ask that man." Josiah, who had straightened up as if he thought he was going to be given a rest, struck across toward the conductor. Half-way across she cried after him, "Hurry up, Josiah."

"The train starts in just five minutes," said the man.

"Oh, that's good," resumed Josiah's talkative wife, "I

thought we would have plenty of time to say good-by after I got on." Then forthwith she began to say good-by. Josiah had not as yet said a word. He was doing her bidding, or as much of it as he could.

"Now, good-by, Josiah, the train will start pretty soon."

Josiah half smiled as if he too was confident it would.

"I'll be back on Saturday, Josiah; take good care of the children."

Her injunctions now began to rain fast upon Josiah's meek memory, for she was directing him how to conduct every detail of family affairs, and each word she called to him as if it was the last she was going to have an opportunity to say.

"Now, don't forget the baby's bottle, Josiah; I gave you the money for it; and tell Jane to feed the old hen, and don't let Carlo get out of the yard, and tell Jane to boil the meat for dinner to-morrow; tell her I'll be back on Saturday, and don't let Bobby go on the roof to fly his kite; be sure and tuck the children in bed, good, Josiah, and tell Jane to air them well, and don't leave the windows too high; and have you any word to send to cousin Sue?"

She probably stopped for want of breath, and Josiah thought he was going to get a chance to say something. He began at his usual slow gait of speech, but before he had said anything she broke out: "Now it's going, Josiah; it's going! Good-by—don't forget the chicken and the children's shoes, Josiah—Good-by—I'll be back Saturday—and the bottle, Josiah—you'll meet the train—and the children's medicine—don't come too close to the window—Josiah, good-by. Don't forget to tell Jane what I said, and be sure and lock the back-door and shutters. Good-by. Good-by, Josiah," and as the train steamed out she was waving her hand out of the window and going over the list, "Dog, hen, babies, shoes, rattle, potatoes, back-door, shutters, bed-room," etc., in a manner that set the whole car in a roar, whereupon Josiah's white coat-tails, having gone out of sight, his wife looked around to see what the people could be laughing at. —Philadelphia North American.

A Scalper's New Scheme.

A dispatch from Louisville, Ky., July 26, says: "The arrest of Frederick H. Field, one of the best known ticket agents in the South, has caused a sensation here to-day. The charge against Field is forgery, and it was preferred by C. P. Atmore, General Passenger Agent of the Louisville & Nashville Railroad. Field recently left a lucrative railroad position to establish an extensive scalper's office in Louisville, with agencies all along the line of the Louisville & Nashville road. This line issues through tickets 'From Louisville to —.' When a person asks for a ticket to a certain point it is written in the blank space. The tickets to small way stations are also made up in the same way. Gap in the Knobs, a point 16 miles below here, is one of these places. It is charged that Field purchased, or caused to be purchased, tickets to the latter point, and, erasing the written name of the place of destination, inserted Montgomery, Ala. The difference in the price is very great. These tickets, it is said, were sold to all points down the road where Field had no agency. For instance, if a person applied to the office for a ticket to Nashville he would be given a ticket to Montgomery and required to pay the cut rate to that point, but would be given a rebate at his place of destination upon the surrender of the ticket. It would then be utilized by the agent at that place to points further down the road. The erasures were effected by means of chemicals.

"Mr. Lytleton Cooke, who is Attorney for the road, said that it was believed by the officials that this fraudulent method had been practiced to a considerable extent, but they had no means of knowing it. The racket is a new one and it was a long time before the railroad people discovered it. Field formerly represented the Erlanger system at Chattanooga. He is a popular young man and belongs to a family of high social standing."

The Engineer's Snake Story.

Henry Andrews, an old engineer on the Nashville, Chattanooga & St. Louis Railway, tells the snake editor of the St. Louis Globe-Democrat an interesting story about the capture of his engine in 1881 when he was pulling a passenger train. His engine was No. 56, and he pulled out of Nashville with a full train of passengers bound for Chattanooga, Knoxville and other points. At Stevenson, Ala., they stopped to wood up, carrying the fuel in their arms. They started again, and just before reaching Anderson station Jim Wilson, the fireman, who had turned around to get some wood, sung out: "Great Scott! Look at that rattler." "I jumped," said the engineer, "as he uttered the words, and to my horror saw a tremendous rattlesnake climbing down from the tender, with half his body over the platform. My hair commenced to crowd my cap off my head, and for to say I was scared doesn't begin to express it. Jim gave a yell, and when I looked around two seconds later to see what he was doing, I saw the rattler crawling into the cab. But Jim was nowhere to be seen. He had jumped off and left me. I pulled back the throttle and leaped over the snake, which rattled as I made the jump, and landed in the tender. Standing on a log, I watched that snake take possession of the cab, which he did without any ceremony. The steam was not completely shut off, and knowing that the train full of passengers was at the mercy of that snake, I started back toward the cab with a stick in my hand, when the rattler, hearing the noise I made, elevated his tail and rattled in a mighty lively fashion. That settled it. By this time we had crossed the mountain and were sailing along pretty lively. No. 6 was waiting for us at Stevenson, and I knew that if that snake ran the engine till we got there, the coroner of the town would be kept busy for a week. Crawling over the tender and making my way into the postal car, I hurriedly told my story to Charlie Henderson, the messenger, and then to Frank Armstrong, the expressman. We held a hasty consultation, and decided that something had to be done, and done quickly. The train was moving along lively, and the thought of No. 6 at Stevenson made us fairly wild. Arming ourselves with pistols furnished by the postal and express men, we carefully crept out to the tender, and, looking into the cab, saw the doggoned rattler stretched out on the board by the window. Well, it didn't take more than three seconds for us to put three bullets into his carcass. They struck him so quickly and so thoroughly that before he could get a chance to rattle he was as dead as Hector. Grabbing a stick, I jumped into the cab, threw the snake out of it, and got hold of that throttle. Well, to make a long story short, I landed old 56 on time at Stevenson; and, strange to say, the first fellow I saw was the coroner, but, thank heaven, there weren't any inquests for him to hold."

A Train Robber's Stratagem.

A dispatch from Elroy, Wis., July 27, says: "A box was shipped by express from Black River Falls to Chicago on Saturday night. The messenger, Major Pierce, became suspicious of the contents, and telegraphed to the authorities here. On the arrival of the train at this place yesterday the box was opened, and inside was found a man armed with a 38-calibre revolver, a billy, a razor, a bottle of chloroform and a bunch of cord. He refuses to give his name. The box was shipped to Sidney L. Barnard, Chicago. Two more persons, supposed to be confederates, were arrested here, and all three are in jail. It is supposed that they had planned to rob the mail and express car. Nothing is known here regarding the identity of the men."



Published Every Friday.

EDITORIAL ANNOUNCEMENTS.

Passes.—All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

THE WEST SHORE AND THE NEW YORK CENTRAL.

The scheme for the union of the West Shore and the New York Central is published. The West Shore is to be reorganized, the first-mortgage bondholders accepting for their \$50,000,000 5 per cents., with four unpaid coupons, \$25,000,000 of 4 per cents., running from Jan. 1 next for 475 years, principal and interest guaranteed by the New York Central, which is to lease the road and receive the whole \$10,000,000 of the capital stock of the reorganized company. A further issue of \$25,000,000 of these bonds will be authorized, to provide for prior liens, reorganization expenses and terminal properties, and for additions to the property, but only at the request of the New York Central Company. It is reported that the New York Central interest had previously secured a large interest in the terminal bonds, the North River Construction Company, and other claims, and it is not supposed that a large part of the additional \$25,000,000 will be required to settle the claims prior to the first mortgage, and that a large part of the bonds will be available for further construction when required.

This will give to the present first-mortgage bondholders a \$1,000 4 per cent. bond for \$2,000 of their present bonds, with \$200 of accumulated interest—about 1.82 per cent. on the whole. This, of course, is a very unsatisfactory return on their investment, but the bonds first sold brought but about 50, and few ever sold for much more than 80, so it is not quite so bad as it looks. Moreover, the present holders are largely persons who have bought within the last eighteen months, and paid 30 to 35 for their bonds, and as they get a long 4 per cent. first-mortgage bond guaranteed by the New York Central for 60 or 70 and interest on that amount for a year or so, they have reason to be pleased with their bargain.

It is probable, therefore, that the New York Central will soon have a parallel line its whole length at the expense of an annual rental of something between \$1,000,000 and \$2,000,000 a year, or \$2,127 to \$4,254 per mile. This is not an insignificant sum; it is more than the net earnings of many railroads which are counted prosperous (the Milwaukee & St. Paul earned \$2,001 net per mile last year; the Northwestern \$2,542), but it is insignificant compared with the earnings of the Eastern trunk lines, the New York Central, only half of which is main line, earning last year even \$10,300 net per mile, and the year before \$13,020, and having \$5,630 of fixed charges per mile; while the Erie last year earned net \$5,162 per mile. The principal of the West Shore funded debt, however, if the whole \$50,000,000 authorized is issued, will be but little less than

the present funded debt of the New York Central (\$56,497,333) on 60 per cent. more road.

The sacrifice of net earnings by the New York Central by its competition with the West Shore during its present fiscal year has doubtless been much more than the maximum rental by this plan. There can be no doubt that it will be much better off with the lease than with the West Shore independent. That it is better off with the new road, even if it had no rental to pay, than if it did not exist, we would not say. Ordinarily we should have no hesitation in saying that one road is worth much more than two over the same route. The West Shore will have to be worked and maintained, as well as the New York Central, and the traffic of the two will be very little more than what one would obtain.

But the West Shore may be worth vastly more to the New York Central than it could be to any one else. The 140 miles along the west shore of the Hudson was needed. That stream is a formidable obstacle to the crossing of traffic, and the country west of it was not well supplied with railroads. In the next place, and chiefly, the West Shore, there is reason to believe, is extraordinarily favorable for conducting a heavy freight traffic. A single locomotive has hauled over it from Buffalo to New York harbor 1,200 tons of freight in a train, and it is said that, with a helping engine for a few miles, 1,500 tons can be taken through in one train. This advantage is of comparatively little value as the road has been, because it could not get the freight to carry. The New York Central can give it the freight and, probably, can do its through business over it much more cheaply than over its own lines, the colossal yards and terminal grounds of which will be available for both. The magnificent rolling stock of the West Shore, of course, will be available anywhere, and it would be a great improvement in many places if its beautiful and comfortable passenger stations could take the place of the more conveniently situated ones of the New York Central, which doubtless will do nearly all the passenger business between Buffalo and Albany.

The outcome of the West Shore enterprise would furnish a text for a discourse, or a series of them, for which we have no time now. A few reflections may be permitted, however. While it confirms the belief, which we have often expressed, that two roads over practically the same route cannot permanently remain separate, but will sooner or later come practically under one control, because thus only can they do their work best and cheapest and make the largest profits, it also brings home to men's minds with great force the fact that where this is so, there especially must the railroad be administered largely as a public trust, with special care to furnish the best service and to give it at low rates. The building of the West Shore was proof that there was an enormous treasury of traffic on the line, since it was believed by expert railroad men that good profits would be got from it for two railroads, while one could carry it all. And at least fair profits could be made from it for two roads if it could be divided equally. Now when a railroad occupies such a position, in the very garden of traffic, it should take pains to leave few inducements to duplicate its line. To do as well as other railroads is not enough; it should do better, for it is able to do better and yet make good profits. It has been claimed for the New York Central that it afforded the cheapest service in the world. This, however, was no merit of the company's whatever. Low as its rates were, it was able to make very large profits on the capital invested, and it did not supply the best service for passengers, but on the contrary was conspicuously inferior in many respects to scores of Western railroads which earn \$2,000 to \$3,000 per mile net per year. The hope of diverting the Central's passenger traffic by supplying superior cars and a more comfortable service had very much to do with the carrying out of the West Shore enterprise. Perhaps a better or cheaper service could not have been afforded by the New York Central without trenching on the 8 per cent. dividends. But there never was the least necessity of paying 8 per cent. dividends. We do not mean to say that there is anything wrong in paying 8 or 16 per cent. on capital invested in a risky enterprise like an American railroad (for evidence that it is risky, see the West Shore bondholders), but that when it is possible to pay profits like that, the railroad first owes the public the very best accommodations and very low rates; and it owes to its own safety, unless its situation is very peculiar, so that it cannot easily be duplicated, either because of the nature of the country or the difficulty of getting capital there (as in some foreign countries), not to make such great profits as to tempt competition. It should not

make so much with one road as to render it probable that a second would make more than ordinary profits. The New York Central has made profits enough for two, and it is this chiefly which has tempted competition, and it is desirable that it always should, or cause some other action which will have the good effects of competition for the public. The cost of the road by its last report was \$114,800,000 (\$31,125,000 less than its stock and bonds), and its profits were at the rate of about 10 per cent. on this cost in 1883 and 1881, 12½ in 1880, and still more than this in several years after the consolidation, when the difference between cost and capital was much greater than it is now (\$52,000,000 in 1870), as many millions of net earnings have been expended for improvements.

Now, a railroad which earns 10 or 12 per cent. on its whole cost is very tempting. It is easy to borrow money on bonds for at least half its cost, and it often is done for the whole, as was intended with the West Shore. But it is tempting enough to borrow only half. Borrowing at 6 per cent. a million for a work costing two millions and returning \$200,000 profit, the million of shares has \$140,000 for its part of the profit. Moreover, in the case of the New York Central, or of any trunk line, it is not necessary to duplicate the whole system, yielding 10 per cent. on its cost, but the new competitor duplicates only the main line, which may be yielding 15 per cent., or more, on its cost.

In a country where a railroad enterprise is carried through so easily as here, it cannot be said that if a line paid only moderate profits it would not be paralleled. There are examples to the contrary. But it is very doubtful if the West Shore would ever have been undertaken had the New York Central paid 6 per cent. in good years and 4 per cent. in bad ones, instead of paying 8 per cent. steadily in good times and bad, on a capital from \$30,000,000 to \$50,000,000 greater than its cost by its own reports.

The experience of the West Shore will doubtless discourage similar enterprises in the future, but it by no means makes them impossible. The public, we may be sure, will not permanently endure a condition of things which gives a corporation a monopoly of an important and indispensable service unless it is given thoroughly good service and at a low price where the profits are good.

THE CHEMICAL COMPOSITION OF SOME BAD RAILS.

The letter published last week in respect to failures in service of over-soft steel rails, proposes as a sort of problem how "a rail can be chemically hard and mechanically soft," as if it were a self-evident conclusion from the analysis given that the rail must be hard, or at least hard enough. This question seems to imply, what we gather from other sources is the fact, although the letter itself does not state it except by implication, that it is claimed for these rails that the analyses show them to be all right chemically, as it is distinctly stated that they were found all right under recognized "old-fashioned" mechanical tests.

The latter question we discussed last week, expressing entire disbelief that the rails in question have shown or could show a good record under any full and fairly conducted series of physical tests of the "old-fashioned" kind alone. The question *why* the rails failed, whether from defects of chemical composition or in the process of manufacture, or both, we shall not now discuss; but it will be of interest to show that the analyses presented do not indicate *prima facie* that the rails are of good quality, but rather that they are of exceedingly bad quality, if judged by the same standard as was apparently held to justify (at any rate which would justify) the declaration that they were "chemically hard."

We presume from the wording of the letter that the standard set up some years ago by Dr. Chas. B. Dudley, chemist of the Pennsylvania Railroad, for measuring the hardness of rails by the number of "phosphorus units" is that referred to as proving that the rails are "chemically hard." Dr. Dudley made two very elaborate and valuable investigations into the chemical and physical qualities of steel rails for the Pennsylvania Railroad (published in the *Railroad Gazette* of Jan. 17, 1879, and Jan. 24, 1881), in which he proposed and used a method of comparing the hardness of rails in which 0.01 per cent. of phosphorus was taken as a "phosphorus unit," and it was assumed that 0.02 per cent. of silicon, 0.03 per cent. of carbon, and 0.05 per cent. of manganese were each equal in hardening effect to 0.01 per cent. of phosphorus; all these elements being classed together as "hardeners" of steel. Within the limits of his investigation Dr. Dudley found that these assumptions seemed to give results harmonizing with the facts, and

although he distinctly disavows all exactitude in these ratios, we have not observed that he admits or suggests that under certain circumstances or combinations a large percentage of these hardeners may exist in very soft rails.

It may be granted at once, for there seems no room for question, that if the analyses submitted by Mr. Hawks be correct, this standard for measuring hardness fails completely when applied to them; for rails which, judged by these "units," should be very hard, are found to be, in fact, excessively soft. But if the comparison with Dr. Dudley's results be pushed a single step further, we shall find that, although they left some room for the question how "a rail could be chemically hard and mechanically soft," they leave no room whatever for the question how "a rail could be chemically good and mechanically bad," for the unavoidable conclusion from a comparison of what he called a good rail with what he called a bad rail is, that if the chemical composition as determined by him be any guide at all as to quality, these rails should be very bad indeed, as they seem to be.

The following comparisons of Dr. Dudley's analyses with those of the Michigan Central rails show this clearly:

Analyses of Good and Bad Steel Rails.
(Percentages and fractions.)

	Dudley's analyses, Penna. R.R.				Dudley's specification...	Mich. Central rails	
	First Series.		Second Series.			Extremes	Aver- age.
	Best 12 rails.	Worst 13 rails.	Best 32 rails.	Worst 32 rails.			
Carbon .....	.287	.366	.334	.390	0.30	.29 to .48	.385
Phosphorus....	.077	.132	.077	.106	0.10	.06 " .15	.105
Silicon.....	.044	.047	.060	.047	0.04	.03 " .05	.040
Manganese.....	.369	.521	.491	.847	0.35	.80 " 1.00	.900
Sulphur.....	.....	.....	.....	.....	.....	.01 " .10	.055
Total ...	.777*	1.066*	.962	1.190	0.79	1.18 to 1.68	1.430

PHOSPHORUS UNITS.

Carbon.....	9.6	12.2	11.1	13.0	10.	9.7 to 12.	12.8
Phosphorus....	7.7	13.2	7.7	10.6	10.	6 " 15.	10.5
Silicon.....	2.2	2.3	3.0	2.35	2.	1.5 " 2.5	2.0
Manganese.....	7.4	10.4	9.8	12.95	7.	16. " 20.	18.0
Total....	26.9	38.1	31.6	38.9	29.	33.2 to 49.5	43.3

*NOTE.—The total 1.066 is given 1.030 by Dr. Dudley in his paper, but this appears to be a numerical oversight, as it does not agree with the total of the averages of each element, which latter are correct according to his full table.

In explanation of the above it should be added that Dr. Dudley made two series of analyses, the first (of 25 rails) being a comparison of 12 rails which broke or crushed in service with 13 rails which did not; and the second, a comparison of the 32 slower-wearing with the 32 faster-wearing rails among a lot of 64 rails, all of which (with one exception) appeared to be sound and good, without sign of crushing or other irregular failure. It may also be noted that a comparison of the first series with the second series forcibly indicates, so far as it goes, that the same causes which make a rail wear easily make it crush or break easily, thus corresponding with what Mr. Hawks says as to the liability of these soft rails to break.

A comparison of these analyses tends strongly to support, so far as it goes, the general correctness of Dr. Dudley's conclusions as to the chemical composition of good rails and bad rails, however it may be with his standard for hardness; for it is immediately evident from them that if we were prepared to accept his analyses as an adequate standard quality, we have reason enough and to spare for the extreme badness of the Michigan Central rails in their chemical composition alone. To make this clearer, let us reduce the table to a few less figures by averaging Dr. Dudley's results:

	Dudley's 44 good rails.	Dudley's 45 poor rails.	Michigan Central rails.	Dudley's specification for good rails.
Carbon.....	0.310	0.378	.385	.300
Phosphorus....	0.077	0.119	.105	.100
Silicon.....	0.052	0.047	.040	.040
Manganese.....	0.430	0.584	.800	.350
Total.....	0.869	1.128	1.430	.790
Phosphorus units...	29.2	38.5	43.3	29.0

It will be seen that (with a possible partial exception in the case of phosphorus) wherever Dr. Dudley's poor rails differ from his good rails, the Michigan Central rails differ still more from the good rails in the direction of badness, and that in the case of manganese the divergence is very great indeed; the average per cent. of that element being higher than in any one single rail out of the whole 89 rails which Dr. Dudley analyzed, one only excepted.

Part of this agreement may be a mere coincidence, and it should be again said that the comparisons are not made as proving that the Michigan Central rails

were of bad chemical as well as mechanical composition. On the contrary, analyses can be produced to show that almost any chemical composition ever heard of is consistent with either good quality or bad quality. Thus, in the discussion on Dr. Dudley's paper, Mr. W. R. Jones, of the Edgar Thomson Steel Works, presented the following analysis of a John Brown steel rail which had given remarkably good service for 11½ years on the Baltimore & Ohio road under 55,000,000 tons duty, which, if it were admitted as adequate evidence, would lead to quite other conclusions:

	B. & O. rail.	Mich. Cen. Dr. Dudley's good rails.
Carbon.....	0.380	0.385
Phosphorus....	0.069	0.105
Silicon.....	0.124	0.040
Manganese.....	1.404	0.900
Sulphur.....	(0.071)	(0.055)
Total.....	1.957	1.430
Phos. units.....	53.2	43.3

Such comparisons, of which many more might be given, tend strongly to support the view that chemical composition plays a minor part in the wearing qualities of rails, and that it may be harmlessly varied within wide limits, according to the characteristics of the iron and process of manufacture. This was strongly urged in the discussion on Dr. Dudley's paper; but on the other hand, no such extended and careful investigation as Dr. Dudley's has as yet been published to prove as much, and certainly a comparison of results with this particular lot of excessively bad rails agrees strikingly with even the details of Dr. Dudley's conclusions. Thus we may quote from his first paper the following statements, any one of which, if accepted as sound, would immediately condemn the rails in question as probably very bad indeed:

1. "If we take any single hardener and follow it through the series, we will usually find that the principal thing we will learn will be that if any one of these hardeners is very high the rail broke (or crushed) in actual service."

In these rails, although the proportion of all the chief "hardeners" is high, one of them is very high, although it does not seem to have had much effect as a "hardener."

2. "In every case in which phosphorus is above 0.12 per cent., the rail either broke or crushed in service."

These rails average 0.105, or close to the maximum limit thus fixed, in this element alone.

3. "It would therefore almost seem fair to conclude that we cannot with safety have the total sum of the carbon, phosphorus, silicon and manganese in our rails as high as one per cent."

These rails, even taking the minimum of each element, average 1.18 per cent.; taking the maximum, 1.68 per cent., and taking the average, 1.43 per cent.

4. "It almost seems fair to conclude, therefore, that, measured in phosphorus units in the manner described, we cannot have rails whose total sum of hardeners in phosphorus units is over 31 or 32."

These rails show 43.3 units, which is approached by but few even of Dr. Dudley's bad rails and exceeded (slightly) by only three out of 44 good rails.

Dr. Dudley's error, therefore (if it be an error, which we will not assume), appears to lie chiefly in the comparatively unimportant point of asserting or implying that an increased proportion of any one of these elements would not only make the rail bad but would make it harder. It is clear that, under certain conditions, their excess rather indicates (or at least is consistent with) extreme softness.

In another and more important matter the results of these investigations have been misinterpreted and misapplied. Dr. Dudley asserted, and we may say proved, that within the limits of his investigation the softer steels gave the better wear, and his language fairly implies that there is no limit to this advantage, so far as wear is concerned, but that a limit to it is fixed otherwise by the necessary condition that the rail shall resist deformation. It seems reasonable to believe that not only has harm resulted from stretching this language further than was intended, but that even in intention it went too far, by asserting in effect that softness was in itself a good thing in a rail. By careful reading of the context one may see indeed that the idea in the mind of the writer, which we can hardly doubt is the true one, was that neither hardness nor softness, but toughness—the best indication of which is the number of foot-pounds of work required to produce distortion or fracture—was the quality which best indicated the quality of rails, from which it follows that a rail may be injured by being either too hard or too soft, if, as might easily happen, its toughness, or resilience, were thereby diminished. But unfortunately the spirit if not the letter of the actual wording conveys the idea that the result of the Pennsylvania investigations was "the softer the rail, the better," and as the investigations deservedly attracted great attention and carried great weight, the impression has spread abroad and become general that

good rails are soft and soft rails are good, until manufacturers have found a way to make rails soft enough to suit any taste. What has perhaps made the matter worse, a softness of such nature that the rails should roll beautifully and make very few "seconds," would naturally be looked on with favor, these being "physical characteristics" which come most immediately under a manufacturer's eye, and to which an ordinary man, under such circumstances, could hardly help ascribing undue weight as an indication of quality, especially when the attention of inspectors has been so largely directed as it has to mere external appearance.

THE CHICAGO & NORTHWESTERN REPORT.

The Chicago & Northwestern Railroad has been a rapidly growing concern, so much so that what was true of it a few years ago might easily not be at all true now. In its fiscal year ending with May, 1877, it worked an average of 1,933 miles; last year, 3,819, an increase of 9½ per cent. It has now several hundred miles of railroad in a country which was almost uninhabited eight years ago, and the changes in rates and traffic have been very great.

The greater part of its great growth has been since 1879-80, when it worked 2,216 miles—1,600 less than last year. That was an extraordinarily favorable year for the Northwestern, as for many other railroads. It earned then \$7,830 gross and \$4,025 net per mile of road. The increase of 72 per cent. in mileage since then has been accompanied by an increase of only 35½ per cent in gross and of \$790,400, or 9 per cent., in net earnings; the gross earnings per mile have fallen from \$7,830 in 1879-80 to \$6,153 in 1884-85; the net earnings from \$4,025 to \$2,542.

It was not to be expected that the additions to the system, which were largely in an undeveloped country, should so soon have as large a traffic as the average of the lines worked in 1880; but they have doubtless added largely in the aggregate to the traffic, and in fact the freight traffic was 63½ per cent. and the passenger traffic 65 per cent. more last year than in 1880, which is not much less than the increase in mileage; but the average rate has decreased from 2.664 to 2.38 cents per mile for passengers, and from 1.49 to 1.19 cents per ton per mile for freight meanwhile, while the average expenses have not decreased. The result is a decrease in the profit per passenger per mile from 1.366 to 0.983 cent., and per ton-mile from 0.755 to 0.491 cent. Thus here, as in the East and the Central states, it is rates chiefly that have changed the financial position of the railroads. The Northwestern's profit has fallen off 28 per cent. on passengers and 35 per cent. on freight since 1880, and this is why an addition of 72 per cent. to its mileage and of 64 per cent. in traffic has brought it an increase of only 9 per cent. in profits.

Fortunately for the stockholders the fixed charges for interest and rental have increased very little, in spite of the great increase in mileage. This is very largely due to the purchase by an issue of stock of the Iowa lines, formerly leased for a percentage of their gross earnings. What has been rental heretofore is now in large part represented by dividends, which are not a fixed charge. The rentals were \$1,353,000 less, the interest on bonds \$1,666,600 more last year than in 1879-80.

The following gives a succinct history of the mileage, traffic, rates, earnings, expenses, fixed charges and profit per share of this company for 13 years:

Year to May 31.	Miles worked.	Pass. miles.	Ton- miles.	Rate per ton.	Gross earnings.
1874.....	1,933	109.1	461.4	3.40 2.40	\$15,632,937
1875.....	1,990	116.8	454.6	3.00 2.12	13,786,304
1876.....	1,992	122.3	503.1	2.85 1.95	14,013,732
1877.....	1,993	116.9	485.4	2.89 1.86	13,033,102
1878.....	2,037	118.9	623.8	2.83 1.72	14,751,063
1879.....	2,159	116.1	681.9	2.79 1.56	14,580,921
1880.....	2,216	140.1	835.9	2.67 1.49	17,349,349
1881.....	2,644	164.3	980.5	2.53 1.47	19,344,072
1882.....	3,033	205.6	1,192.2	2.52 1.47	22,684,656
1883.....	3,465	248.9	1,183.8	2.46 1.42	24,081,834
1884.....	3,720	256.4	1,350.2	2.40 1.31	25,020,624
1885.....	3,819	231.1	1,416.8	2.38 1.19	23,562,056

	Expenses.	Net earnings.	Int. and sinking fund.	Lease rents.	Profit per share.
1874.....	\$10,199,742	\$5,432,195	\$3,026,999	\$1,019,649	\$3.72
1875.....	8,781,270	5,005,034	3,400,448	1,085,950	1.43
1876.....	8,274,290	5,739,442	4,399,013	1,142,646	3.28
1877.....	7,526,101	5,507,001	3,485,735	1,092,954	2.55
1878.....	7,620,946	7,130,117	3,452,411	1,213,219	6.75
1879.....	7,707,649	6,873,272	3,360,912	1,225,732	6.27
1880.....	8,431,000	8,917,740	3,455,920	1,381,661	11.18
1881.....	10,425,821	8,908,251	3,746,017	1,384,732	10.28
1882.....	12,619,634	11,045,022	4,097,329	1,569,618	14.44
1883.....	14,072,516	10,009,318	4,386,753	1,570,948	10.34
1884.....	15,140,957	9,879,067	4,610,235	1,568,704	9.50
1885.....	13,793,907	9,708,148	5,122,534	28,567	8.40

The increase in mileage last year over 1884 was less than 3 per cent. The passenger traffic decreased 10 per cent., and was the smallest since 1882. The freight traffic increased 5 per cent. It has increased every year but one since 1877, but not as much as usual last year. The passenger rate decreased 1 per cent., and the freight rate 9 per cent., below the rates of 1884.

The gross earnings were 6 per cent. less than the year before, and were even a little less than in 1882, in spite of an increase of 26 per cent. in mileage and 17 per cent. in traffic since that year, due chiefly to a decrease of 20 per cent. in the average freight rate, but partly to a decrease of 6 per cent. in the passenger rate. The working expenses were reduced 9½ per cent., so that the falling-off in net earnings was only 1¼ per cent. The increase of \$512,000 in the interest charges was more than made good by the decrease of \$1,540,000 in the lease rents, and thus there was a surplus available for dividend amounting to \$4,557,000 last year, against \$3,700,700 the year before, and \$4,052,000 in 1883. But owing to the increase of \$14,757,600 in the stock, issued for the purchase of the Iowa leased roads, it requires more now than formerly to pay the same rate of dividend, and the profit per share was reduced 9½ per cent., and was the smallest since 1878-79.

Last year was a year of unusually large crops in all the vast territory served by the Northwestern, and it should, therefore, have carried a decidedly larger amount of produce than ever before. Manufacturing and trade were not very active, immigration was the lightest for several years, and this tended to decrease traffic, while the crops tended to increase it. Actually we have seen that the aggregate freight traffic increased 5 per cent., while the passenger traffic decreased 10 per cent. The report points out one of the chief causes of the decrease in freight earnings, which amounted to \$760,473. This company carries all the iron ore produced in the Menominee district, west of Green Bay, in Wisconsin and Michigan, and a large part of that mined in the Marquette district. The haul is not long, but the shipments of late years have been enormous, and a few years ago the ore could pay rates that yielded a good profit. The depression in the iron trade has reduced the demand for ore and greatly reduced the price, and with it the rate for transportation (by lake as well as by rail). Now the report says that the reduction in the earnings on this freight since 1883-84 has been no less than \$749,367, so that the other freight earnings fell off only \$11,106. A considerable part of the reduction in earnings on ore shipments was due to smaller shipments, so that the other traffic must have increased considerably more than 5 per cent.; and no doubt the farm produce shipments were very much larger than in 1884, or any previous year. Thus the new lines and the large crops are seen to have done something for the company, which one noticing the decrease in earnings might not think.

It will be noticed that though there was some increase in the traffic last year (not quite 1 per cent.), and a slight increase in train mileage, and an increase of 2½ per cent. in the mileage worked, there was the very large decrease of 9½ per cent. in working expenses, and that but for this reduction, the surplus over fixed charges would have been not \$8.49 but only \$5.94 per share of stock. Let us see where this great reduction was made.

An examination of the items of working expenses shows that two-thirds of the saving was in maintenance expenses, some of which have been very greatly reduced. For instance, the consumption of rails and ties for renewals and repairs has been for four years:

	1882.	1883.	1884.	1885.
Miles track.....	3,338	3,821	4,150	4,321
Tons steel rails.....	23,414	11,54	19,989	9,939
—Miles track.....	248	112	202	99
Per mile track, tons.....	7.02	2.92	4.81	2.30
Per cent. of track renewed.....	7.36	2.93	4.87	2.29
No. ties.....	914,896	758,244	1,072,465	825,879
—Miles track.....	277	270	389	313
Per mile track, No.....	274	198	250	192
P. c. renewed.....	9.80	7.07	9.23	7.24
Cost:				
Rail renewals.....	\$702,247	\$297,625	\$403,228	\$177,437
Per mile track.....	210	78	97	41
Tie renewals.....	275,916	272,163	371,632	302,293
Per mile track.....	83	71	88	70

The quantities used give a better criterion of the amount of renewals than the cost. It will be seen that they have varied greatly, from 7½ per cent. of the whole rails in track in 1881-82 to 2½ last year, the latter sufficient to renew the track once in 43 years. The tie renewals have in none of these years been at the average rate; at least seven to eight years is counted the average life of ties; but at the rate shown in 1882 it would require 10.2 years, and at last year's rate 13.8 years to renew them.

These are comparatively not very important items of expenses, but they are the only ones in which we have quantities given to compare with the cost. Below we give the maintenance expenses for six years, for rolling stock, etc., as well as road:

	Maint. of road.	Structures.	Cars.
Year to	Total.	Total.	Total.
May 31.	Per mile.	Per mile.	Per car.
1880.....	\$1,029,013	\$691,547	\$588,105
1881.....	1,921,814	808,899	702,617
1882.....	2,518,320	1,056,099	980,288
1883.....	2,278,839	1,094,156	1,393,632
1884.....	2,616,427	974,491	1,491,031
1885.....	2,196,821	742,430	1,269,036

* Of road, not track. + Bridges, fences, buildings, etc.

	Locomotives.	Wages.	Fuel.
	Per engine.	Per mile.	Per eng. mile.
1880.....	\$488,065	\$3,094,785	\$843,560
1881.....	630,832	3,726,132	1,178,764
1882.....	805,853	3,927,082	1,598,383
1883.....	928,468	4,354,027	1,937,235
1884.....	957,475	4,751,470	2,033,937
1885.....	924,188	4,765,275	1,809,779

The great changes are in the expenditures for maintenance of road and structures, which for road was 12½ per cent. less for 3,819 miles in 1885 than for 3,033 miles in 1882, and per mile of road is 30½ per cent. less than in 1882, and 18 per cent. less than in 1884, while for bridges, buildings, etc., the reduction was even greater. Car maintenance expenses, though a fifth less per car than for the two years previous, were larger than in previous years, and the expense for maintenance of locomotives is but little below the average. We have added the items of wages and fuel (wages not including those for the force on the road and in shops), which are much less elastic than the maintenance expenses. The wages have varied little per mile for four years; but there is a reduction in the fuel account of 11 per cent., evidently due to the lower price of coal, as there was no decrease in train mileage.

It is evident from the above that the expenditures for maintenance of road and structures last year were not equal to the average requirements. But a very large proportion of the road is new, and this should not require average expenditures for renewals. This was just as true last year, however, and therefore the satisfaction with which the small decrease in net earnings is contemplated must be modified by the reflection that it would have been large but for the great decrease in maintenance expenses, amounting to \$1.70 per share of stock issued.

The purchase of the Iowa leased lines simplifies the financial position of this company and for the first time makes it possible to state its charges prior to dividend payments. At the close of the last fiscal year, including the bonds issued for the Belvidere-La Salle line, which is not yet built, the funded debt was at the rate of \$23,797 per mile of completed road, the yearly interest on which is \$1,486. The capital stock outstanding (there are \$10,000,000 of common in the treasury) is at the rate of \$13,970 per mile, \$5,800 of which is preferred. Thus an increase of \$140 per mile in the net earnings is sufficient for 1 per cent. more on the stock. Last year these net earnings were \$2,542 per mile, and for eight years they have been:

	1878.	1880.	1881.	1882.	1883.	1884.	1885.
\$3,500	\$1,228	\$4,025	\$3,369	\$3,642	\$2,880	\$2,656	\$2,542

As the new road develops these are almost sure to increase again, unless railroads are multiplied in this territory; but it will not do to count on the stock's getting all the increase. A great system of new road with growing traffic must increase its capital expenditures constantly, and often largely. The Northwestern ten years from now will represent a capital per mile much more than the \$37,767 of its present stock and bonds, unless it shall meanwhile further greatly increase its mileage by adding cheap roads in new country. If, however, there shall be no undue multiplication of roads in the territory which it serves, it has a brilliant future before it, as certain as the growth of that great country.

The most encouraging sign of better business is the large increase in the shipments of goods from New York. Last June the through shipments by the trunk lines were larger than in any previous June, except in 1882, which was the last month of a very low rate. This year the June shipments were 18 per cent. more than last year or in 1883, 25 per cent. more than in 1881, and 40 per cent. more than in 1880. In July, so far as reported, the shipments have also been larger than in other years.

It is true that shipments are stimulated now by excessively low rates, such as had a great effect in 1881 and 1882; but the rates have been low all this year, and before June the shipments had not been quite as great as last year. It may be, however, that the increase is due to a diversion from the canal boats, which did not begin to run till well into May.

June earnings are reported for only nine more railroads this week, but among the nine are the Pennsylvania and the Reading, and the aggregate earnings of the nine are 6½ times as great as those of the 14 that reported last week, and nearly half as great as those of the 64 that have reported down to this week. The roads reporting this week are distinguished by having an increase in their aggregate earnings, which is almost wholly due to the Reading, which had a gain of \$279,530 (18 per cent.), over its very light earnings of last year, earnings in June for the three years that it has worked the Central of New Jersey having been:

	1883.	1884.	1885.
\$2,810,480	\$2,148,704	\$2,428,203	

Thus though the earnings this year were \$279,530

more than last year, they were \$382,196 less than in 1883. Of the other eight roads, five had a decrease in earnings, that of the Mobile & Ohio being 17½ and that of the St. Joseph & Western 28 per cent. The Pennsylvania's earnings we have considered at length elsewhere. The Mobile & Ohio has not had so small June earnings before for five years. Aside from the Reading, no road but the Susquehanna & Western shows a considerable increase. The Northern Central shows but a very slight change from last year, when its June earnings were the smallest for five years.

The 72 railroads that have reported so far show the following aggregate earnings:

	1885.	1884.	Decrease.	P. c.
Earnings.....	\$23,708,262	\$24,394,306	\$686,044	2.9

This is a much smaller decrease than in May, and would indicate an improvement but for the fact that June earnings were unusually light last year.

The number of immigrants arriving during the last fiscal year, as reported from districts where all but 1.7 per cent. of them arrived last year, 1.8 the year before, and 2½ per cent. in 1881-82, were 387,821, indicating that the total arrivals were 395,000. Estimating the increase of population yearly as 2 per cent. of the population at the beginning of the year plus the immigration, which has been shown by Col. Wm. M. Grosvenor to account almost exactly for the increase shown by the census from 1870 to 1880, this makes the population, July 1, 1885, 58,474,000, against 50,156,000 by the census of 1880, an increase in five years of 8,318,000, or 16.6 per cent., at which rate in 1890 we shall have 67,970,000 people in this country. We shall not, however, have such an increase unless immigration increases largely beyond what it was last year. A material part of the increase in the last five years has been due to the extraordinary immigration, amounting to 2,969,000, against 1,726,000 in the corresponding five years of the previous decade, which was also a period of extraordinary immigration, only 1,085,000 arriving in the last half of the decade. Should there be a similar decrease in immigration from now until 1890, the rate of increase for the whole decade would still be a little greater than from 1870 to 1880.

There are two sources of error in these estimates. The first is the admitted inaccuracy of the census of 1870, which failed to enumerate a considerable part of the population in several of the Southern states. The larger the population in 1870, the smaller the average percentage of natural increase which, with the immigration, made up the population in 1880: the absolute increase would be less, and the population from which it sprang would be larger. If the error was as much as a million, however, which is improbable, the difference in the rate of increase would be less than a tenth, and we should have to reduce the increase from 1880 to 1885 only about 600,000 on that account, leaving the total July 1 last about 57,874,000.

The other source of error is the possible change in the rate of natural increase. This rate in the long run will certainly decrease, and it has already decreased largely since 1840 or 1850; but it is not likely to decrease very largely from one decade to another, and the arrival of large numbers of persons from abroad, who are chiefly of the child-bearing age, tends to increase the rate. Thus until another census gives a new basis for calculation, we shall adhere to the basis of 2 per cent. a year plus the immigration, and call the population of the United States at the beginning of this fiscal year (July 1) 58,474,000, which gives about 463 per mile of railroad, against 580 at this time in 1880—just about one-fifth less now.

While many things on the Baltimore & Ohio Railroad excited general approval on the recent trip of the American Society of Civil Engineers over that line, was one which emphatically failed to do so, but on the contrary provoked no little unfavorable criticism, and with much apparent justice. For the greater portion of the entire distance between Baltimore and Deer Park the posts carrying bridge numbers and other signals, the cast-iron parts of the switch stands, the elbows of the water-cranks, and some other permanent fixtures of the kind, are painted a bright vermilion, of much the same shade as the red bunting commonly used on that road, as elsewhere, for danger signals. The effect is that once on every mile at least, and on an average much oftener, there is a permanent red signal which means safety, or rather means nothing at all, and yet which, seen through the trees or around curves, would be indistinguishable from any real red danger signal unless violently waved, or perhaps in a gale of wind indistinguishable even from one violently waved.

As a mere question of esthetics the effect is unde-

sirably striking, especially around stations, where the multitude of bright red trimmings has a very gay effect; but it does entire violence to the general feeling and practice of railroad men, which is, we take it, that it should be impressed upon employes in every way that red means danger and danger is red, under all circumstances. With glimpses of bright red which means nothing coming into view every minute or two, how can men be expected to pay much attention to an actual red danger signal until they are almost upon it, so as to be able to see, not alone that it is red, but that it is a flag? On a road with so many curves and so much timber and shrubbery along the line as the Baltimore & Ohio, this use of red seems particularly objectionable. Perhaps the distinction is that danger is a dirty red and safety is a bright red, but that is rather an unreliable distinction; for although red flags are usually dirty, yet they must sometimes be new and bright.

June Earnings of the Pennsylvania Railroad.

The June report of the Pennsylvania Railroad is the most unfavorable one yet made, a fact which has not been generally apprehended, because, owing to unusually light earnings last year, the decrease, compared with that year, is not so great as in several previous months. But that they were absolutely bad may be known by the fact that with the exception of last February, naturally a month of light earnings, the net earnings of the Pennsylvania Railroad were less last June than in any previous month since June, 1879, and compared with the previous months they were:

Jan.	Feb.	March.	April.	May.	June.
\$985,974	\$830,409	\$1,161,109	\$1,272,948	\$1,355,295	\$909,437

being thus one-third less than in May. June, however, is a month of light net earnings, owing to the very large expenditures made in that month, largely for maintenance, doubtless. The gross earnings are usually but little less than in May and more than in April, and they were this year.

If the losses on the lines west of Pittsburgh and Erie be subtracted, the result in June compares still more unfavorably with preceding months, as follows:

Jan.	Feb.	March.	April.	May.	June.
\$912,554	\$639,689	\$1,105,069	\$1,202,505	\$1,161,718	\$606,689

Thus the profits from the two systems in June were 48 per cent. less than in May, 49½ per cent. less than in April, and even a little less than in February.

But we must warn the readers again that June is usually a month of light profits, and last year the decrease from previous months was even greater than this year, as follows, the figures being, as above, net earnings of the lines east of Pittsburgh, less the deficit of the lines further west:

Jan.	Feb.	March.	April.	May.	June.
\$1,050,551	\$978,807	\$1,378,513	\$1,737,475	\$1,495,837	\$771,112

when in June the profits were \$724,725 less than in May (against a decrease of \$555,029 this year) and \$966,363 less than in April (against \$595,816 this year.) Thus the very small profits in June are not as alarming as a simple comparison with previous months would make them appear.

We now make our usual comparison with previous years. The gross and net earnings and working expenses in June of the lines east of Pittsburgh and Erie for 13 successive years have been:

Year.	Gross earnings.	Expenses.	Net earnings.
1873.....	\$3,527,427	\$2,845,593	\$681,865
1874.....	3,109,680	2,150,146	1,949,543
1875.....	2,996,345	2,001,749	994,596
1876.....	2,940,192	1,959,180	981,012
1877.....	2,446,176	1,612,828	833,348
1878.....	2,380,200	1,475,867	904,333
1879.....	2,390,809	1,789,815	600,994
1880.....	3,221,477	2,209,232	1,012,245
1881.....	3,807,458	2,318,902	1,488,556
1882.....	4,003,757	2,559,431	1,544,326
1883.....	4,156,872	2,977,737	1,179,135
1884.....	3,906,175	2,823,156	1,083,019
1885.....	3,735,639	2,826,202	909,437

The gross earnings of the month this year were the smallest since 1880, and the net earnings the smallest since 1879. Compared with last year and the year before, the decreases have been:

Since 1884:	Gross earnings.	Expenses.	Net earnings.
Amount.....	\$170,536	Inc. \$3,046	\$173,582
Per cent.....	4.4	0.1	16.0
Since 1883:			
Amount.....	\$421,233	\$151,535	\$269,698
Per cent.....	10.1	5.1	22.9

The largest gross earnings and expenses were in 1883, but the largest net earnings were in 1882, and from these the decrease this year is 34 per cent.

The surplus or deficit of the lines west of Pittsburgh and Erie in June has been:

1879.	1880.	1881.	1882.	1883.	1884.	1885.
Deficit.	Surplus.	Deficit.	Surplus.	Deficit.	Deficit.	Deficit.
\$253,387	\$16,877	\$28,906	\$103,778	\$170,290	\$311,907	\$300,748

It seems thus that in only two years has this system earned more than its interest, etc., in June, and that the deficit was a little larger last year than this.

Adding the surplus and subtracting the deficit of the Western system from the net earnings of the Eastern system, we have as the company's income from both systems:

1879.....	\$348,697	1883.....	\$1,002,845
1880.....	1,059,122	1884.....	771,112
1881.....	1,459,631	1885.....	606,689
1882.....	1,430,548		

The decrease is 21 per cent. from last year, 39 per cent. from 1883, 57 per cent. from 1882, and 58 per cent. from 1881; but compared with 1879 there is an increase of 75 per cent.

For the half-year ending with June the gross and net

earnings and working expenses of the lines east of Pittsburgh and Erie have been:

Year.	Gross earnings.	Expenses.	Net earnings.
1877.....	\$14,396,386	\$9,606,977	\$4,729,419
1878.....	14,451,938	9,106,940	5,345,898
1879.....	15,414,058	9,568,203	5,845,855
1880.....	19,434,071	11,339,692	8,094,409
1881.....	21,553,839	12,556,685	8,997,154
1882.....	22,650,853	14,460,934	8,189,919
1883.....	24,352,586	15,833,962	8,518,624
1884.....	23,333,256	15,221,216	8,112,040
1885.....	21,319,600	14,799,942	6,519,658

The gross earnings this year are the smallest since 1880, and the net earnings the smallest since 1879. Compared with last year and the year before the decreases are:

Since 1884:	Gross earnings.	Expenses.	Net earnings.
Amount.....	\$2,013,654	\$421,274	\$1,592,382
Per cent.....	8.0	2.8	18.6
Since 1883:			
Amount.....	3,032,986	1,034,020	1,998,966
Per cent.....	12.5	6.5	23.5

The net earnings were largest in 1881, and the decrease since has been 27½ per cent.

The surplus or deficit of the lines east of Pittsburgh and Erie has been:

1879.	Deficit.	\$419,337	1883.....	Surplus.	\$215,674
1880.	Surplus.	1,341,107	1884.....	Deficit.	704,855
1881.	"	1,524,684	1885.....	"	896,008
1882.	"	35,463			

Thus the western system has held its own much better than the eastern system, compared with recent years, being but \$121,153 behind last year, while the eastern system is \$1,592,382 behind; but compared with 1880 and 1881 there is a great decrease on the western system also.

Adding the surplus and subtracting the deficit of the western system from the net earnings of the eastern system, we have:

1879.....	\$5,426,318	1883.....	\$8,734,298
1880.....	9,435,516	1884.....	7,347,185
1881.....	10,522,018	1885.....	5,633,650
1882.....	8,225,383		

This shows immense fluctuations. The income from the two systems nearly doubled from 1879 to 1881, and now it has fallen back nearly to the 1879 figures. The decrease from last year is \$1,713,535, which is 1½ per cent. on the present capital stock of the company. The decrease from 1883 is 35½ per cent., and from 1881 46½ per cent., amounting to \$4,888,368, which is 7 per cent. on the stock outstanding at the beginning of that year.

Last year this company had, after paying all charges and 7 per cent. on a somewhat smaller capital stock than the present, a balance of \$1,440,425. Of this \$1,020,691 went for the settlement of sundry accounts, or was charged off for depreciations, leaving a balance of \$419,734 credited to income account. The decrease in the profits of the two systems shown above, \$1,713,535, is \$278,000 more than the entire surplus last year, and \$1,296,000 more than the surplus credited to profit and loss.

This year the company is paying 6 per cent., which will require \$5,686,671 and \$864,114 less than was paid last year, but the decrease in profit on the two systems during the first half of the year has been nearly twice as great as that.

It is not probable, however, that the decreases in the last half of this year will be as great as they were in the first half; not because there is an assurance of an improvement in earnings, but because the net earnings last year decreased largely in the last half of the year, but not in the first half. Indeed, in the first half of 1884 the profits of the eastern system were but \$406,584 less than 1883, while in the last half the decrease was \$1,089,616. We have so far been comparing with months of large earnings. Important decreases did not begin last year till October.

The South Pennsylvania.

Two of the conditions absolutely necessary for a compromise of the trunk line difficulties will probably be fulfilled. It is conceded that the Drexel, Morgan & Co. circular to the bondholders of the New York, West Shore & Buffalo would not have been publicly issued before they had secured absolutely a sufficient amount of securities to assure the success of their plan, in spite of opposition on the part either of mortgage bondholders, terminal bondholders, or the holders of North River Construction Company's stock and floating debt. The suspension of operations on the South Pennsylvania Railroad meets with a firm and decided opposition on the part of a very large minority of the parties in interest, who numerically outnumber the Vanderbilt following; but instead of pushing their claims in court, the Pittsburgh interest seems disposed to accept the situation with what little grace they can command; and the project for another line straight across the Keystone state, first conceived more than thirty years ago, seems destined to another long and indefinite rest.

This route, characterized in a report published in 1869 as "the best railway route from the North American seaboard to the Ohio River," and "the best possible railroad location existing in Pennsylvania between the seaboard and the Ohio," was adopted by the South Pennsylvania Railroad Company, and the report of that year claims that "New York by this route is at least 150 miles nearer to the heart of the country than it is by its own system of roads." The same report fixes the cost of the road at \$45,000 per mile, and offers three plans—one for a connection with the Connellsville road at Bridgeport, 135 miles from Harrisburg; another for a connection at West Newton, 205½ miles west of Harrisburg, and a third for 238½ miles to Washington, there to connect with Wheeling by a better route than that of the Baltimore & Ohio. The road was originally chartered as the Duncannon, Landisburg & Broad Top Railroad Company, to build a road from Duncannon on the Pennsylvania to Broad Top Mountain and Bedford County. A year afterward the title was changed to the Sherman's Valley & Broad Top, and the point of connection with the

Pennsylvania from Duncannon to Fishing Creek. The promoters of this scheme came to the Legislature almost every year. In the following year they obtained the right to borrow money and issue bonds, and the year after, in 1857, the right to extend the line to a connection with the Pittsburgh & Connellsville and the Allegheny Portage road, to construct laterals and telegraph lines, and to increase their capital to ten millions. Two years later the title was again changed to the Pennsylvania Pacific Railway Company, and an extension westward to the state line of Maryland and Virginia was authorized. Nearly all these acts contained a provision extending, from time to time, the limitation of time within which the road must be built. An act was passed in 1862 for this purpose, and in the following year the title was again changed to the South Pennsylvania Railroad Company, and an increase of capital to \$20,000,000 authorized. After that time the corporation slumbered peacefully on, being aroused only about once a year in order to go through the form of holding an annual meeting and keeping the charter alive.

The adoption of the new constitution in 1874 infused a little life into the corporation, because that instrument put an end forever to the granting of those fearfully omnivorous charters which permitted an association of individuals to obtain corporate power to do almost anything under the sun, whenever and wherever they chose, and made a legislative term a source of wealth to unscrupulous members. What few charters were still unused became valuable in proportion to the powers they conferred, and have since been disposed of at steadily increasing prices. There are many of them still in existence, which are kept alive by other corporations, solely on account of the powers which they grant and which the Legislature can no longer give away. The South Pennsylvania charter was one of these, and it was not difficult to raise what little money was necessary to keep up its existence, in the hope that some time in the future it could be disposed of to advantage. The headquarters of the corporation were nominally at Harrisburg, and a considerable number of shares were held by people of small means in that vicinity and in the counties through which the road was to be built. Mr. Oliver W. Barnes, a consulting engineer of New York, who has been largely interested in railroads and who built the Kinzua viaduct for the New York, Lake Erie & Western, had invested some money in this speculation, and a few years ago sent a force of men over the line and made an entirely new survey, relocating the route of the road through the Cumberland Valley, and making such changes in the line as reduced the distance over this proposed route to 229 miles from Harrisburg to Pittsburgh.

When Mr. Vanderbilt's attention was turned to the opportunity thus afforded for the construction of a shorter route than any in existence between the Atlantic and the Ohio River, the matter was turned over to Mr. H. McKee Twombly, who sent his agents to Pennsylvania and secured the controlling interest in the corporation, and finally made terms with all the stockholders in the old corporation. A road had been projected eastward from Pittsburgh with Harrisburg as its ultimate destination, but primarily for the purpose of reaching an important coal field in West Virginia. This was the Pittsburgh & Atlantic, of which E. K. Hyndman, formerly of the Baltimore & Ohio, was President. The new investors in the enterprise paid the projectors of the Pittsburgh & Atlantic \$75,000 for all their rights, title and interest, plans and surveys, and then found it necessary, having similarly acquired the surveys made by the direction of Mr. Barnes, to make an application to the Pennsylvania Legislature for the right to increase their capital stock and their proposed issue of bonds, the limit prescribed by law being \$60,000 of stock and bonds to the mile. This brought the new corporation under the provisions of the new constitution, though, of course, without prejudice to the rights granted in the original charter, one of which was that of the purchase of coal lands and the right to operate the coal mines.

A syndicate was then formed for the construction of the road. The American Construction Company, organized with a nominal capital of \$2,000, took the contract to build the road for \$15,000,000. The subscribers of this amount agreed to pay this amount in installments of not more than 5 per cent. per month, and after 20 per cent. had been paid in, were to receive first-mortgage bonds for the full amount of each installment that was paid. These bonds, by the way, are all engraved, signed and ready for immediate issue. On the completion of the road they were to receive an equal amount of stock, and then it was anticipated that \$3,000,000 to \$5,000,000 more would be raised on an equipment bond, in order to furnish the necessary rolling stock and motive power. The question of laying a second track was left to the future. The construction company was to lay one track only, with about 40 miles of sidings. Thirty per cent. of the subscription has been called and paid in, but in view of the unpromising condition of the money market, the syndicate, with the single exception of Mr. Ralph Bagaley, of Pittsburgh, who originally subscribed \$1,000,000, and afterward assumed \$100,000 of the subscription of President W. N. Riddle, of the defunct Pennsylvania National Bank, agreed to the postponement of any issue of bonds until after 50 per cent. of the subscription had been paid in.

The syndicate has not been entirely harmonious from the very beginning. The Lake Shore interest favored the stopping of the line at Somerset, where it would connect with the Baltimore & Ohio, thus materially reducing the cost of the line, avoiding competition with the Baltimore & Ohio and securing a longer haul over the Pittsburgh, McKeesport & Youghiogheny, while the Pittsburgh interest was determined upon carrying out the original plan and having the shortest route. Only two months ago they carried their point, and that location was decided upon. Now that Mr.

Vanderbilt finds it necessary to sacrifice this enterprise as a peace offering to the Pennsylvania, he finds the most decided opposition from the Pittsburgh interest, although they seem pretty thoroughly convinced that they cannot help themselves. Since the subscription was originally opened, John D. and William H. Rockefeller have taken the \$1,000,000 subscription originally belonging to H. W. Oliver, and the \$50,000 held by W. N. Riddle, in addition to \$100,000 taken by Ralph Bagaley, has gone to some other subscriber. So far as is known the subscribers stand about as follows, with the amount of their subscriptions upon, Mr. Vanderbilt's offer of bonds bearing 3 per cent. interest for the amount of money which they have paid in:

In favor, W. H. Vanderbilt, \$5,000,000; William C. Whitney, \$250,000; Augustus Schell, \$100,000; A. S. Hewitt, \$100,000 (because he has the same amount of West Shore bonds); S. B. Elkins, \$100,000 (because he has other projects more important to him and does not care about putting in any more in this).

Against, D. Hostetter, \$2,000,000 (because he is largely interested in Pittsburgh and the Pittsburgh & Lake Erie); H. Phipps, Jr., \$500,000; H. C. Frick, E. W. Ferguson and J. W. Brookman, \$250,000 each; E. C. Knight (Reading director), B. F. Jones, C. and H. Borie, \$200,000 each; J. B. Lippincott (Reading director), John Kean (New Jersey Central director), F. B. Gowen, Henry Lewis (Reading director), and I. V. Williamson (Reading director), \$100,000 each, and J. W. Chalfant, \$50,000.

Nothing has been heard from Mr. Carnegie (\$1,000,000), who is abroad, the Rockefeller interest is uncertain, and D. O. Mills and Oliver H. Payne, who are down for \$500,000 each, and Christopher Meyer, who is down for \$50,000, are thought to be unwilling to compromise on 3 per cent. per annum instead of the handsome profit which they expected to make upon an enterprise in which they took part for no other interest than profit for themselves.

It is evident that Mr. Vanderbilt will have the support of the majority in interest of the syndicate, but it is not yet certain that the minority will accept the offer without litigation. It is not necessary that they should, however. They cannot prevent the Pennsylvania, or people acting in the interest of the Pennsylvania, from acquiring a controlling interest in the company, and we may be pretty sure that when this is the case it will not be permitted to do much harm to the Pennsylvania Railroad. If any one wishes to build a railroad on that location, however, he is free to do it under the general railroad law of Pennsylvania. He will need to begin with a good deal of money, however, for he will have a great deal of trouble in borrowing any in the present condition of things.

Chicago through shipments eastward last week show very distinctly the effect of the advance of rates from 15 to 20 cents for grain, which went into effect on Monday of the week before, but, as usual, applied to but a small part of the freight reported as forwarded in that week. The shipments last week (ending July 25), and in corresponding weeks of previous years, have been, in tons:

1880.	1881.	1882.	1883.	1884.	1885.
33,373	54,211	22,784	27,603	31,858	20,543

Thus the shipments this year were 35½ per cent. less than last year, and less than in any other year of the six.

The total shipments and the percentage going by each railroad in each of the last six weeks have been:

	June	June	July	July	July	July
Tons:	20.	27.	4.	11.	18.	25.
Flour.....	3,843	4,916	4,972	5,474	5,044	2,754
Grain.....	31,223	21,562	24,802	20,864	19,128	9,778
Provisions.....	8,242	8,439	8,949	7,584	8,219	8,011
Total.....	43,308	34,917	38,813	33,922	32,391	20,543
Per cent.:						
C. & G. T.....	21.4	11.3	9.5	10.8	11.9	14.3
Mich. Cen.....	14.1	17.6	21.0	17.4	17.4	8.8
Lake Shore.....	10.7	12.3	15.9	20.0	14.8	14.0
Nickel Plate.....	15.7	14.4	11.5	7.6	9.7	7.1
Pt. Wayne.....	16.6	21.0	19.9	16.0	19.0	23.7
C. St. L. & P.....	7.4	7.7	6.0	7.8	7.5	12.3
Balt. & Ohio.....	6.3	8.3	9.1	8.6	10.1	8.1
Ch. & Atlantic.....	7.5	7.4	7.1	11.8	9.6	11.7
Total.....	100.0	100.0	100.0	100.0	100.0	100.0

Thus the large decrease in shipments was almost exclusively flour and grain; compared with the previous week 45½ less flour and 48.9 per cent. less grain went forward by rail. This accounts for the great changes in percentages, those roads which are accustomed to carry a large share of the provisions showing a gain, while most of the others have a great loss. Thus the Chicago & Grand Trunk had an unusually large share of the total shipments; yet its share of the flour fell off nearly 40 per cent., and of the grain 41 per cent., and of provisions 3 per cent. (more than the average); but the previous week 45 per cent. of its freight was provisions, which was less than 25 per cent. of the aggregate shipments. On the other hand, only 7 per cent. of the Michigan Central's freight was provisions, and a decrease equal to the average decrease in flour and grain (it actually suffered much more than this) would have greatly reduced its percentage. The three Vanderbilt roads together carried 29.9 per cent. of the whole last week, against 41.9 the week before, and from 40.8 to 48.4 for four weeks previous; the two Pennsylvania roads (which are great provision carriers), on the other hand, carried 36 per cent. of the whole last week, against 26½ the week before, and 23.6 to 35.4 in the four previous weeks. These two roads carried 42½ per cent. of the provisions last week and 35.6 the week before. The Chicago & Atlantic has kept up its proportion in spite of the fact that its freight is chiefly grain. Last week it carried 16½ per cent. of the grain, and the week before 12½ per cent., and it also increased its small share of the provisions from 7.1 to 9.4 per cent.

The indications are that the rates were generally maintained last week by all these lines, except, perhaps, that previous contracts had been made at old rates for some ship-

ments; but there is one line that does not report, made up of the Chicago & Atlantic and the Wabash to Detroit, and thence of the Grand Trunk and the Lackawanna or West Shore. The other Chicago roads do not recognize this as a legitimate line, or rather insist that the shipments by it should be charged to the Chicago & Atlantic road. The freight is received in Chicago by the Wabash, which hauls it with its own motive power over the Chicago & Atlantic to the junction with its Detroit line. When rates were lowest it is said to have cut them to receive traffic for this line, and now that rates have been advanced it is able to get a considerable amount of freight without loss, by keeping a few cents below the regular rate. It is not at all probable that rates can be maintained by the other roads so long as this continues. The lines east of Detroit could stop it if they would agree; but, even with the West Shore under Vanderbilt management, it is questionable whether they can be made to agree on this point.

The immigration in May was 19 per cent.; in June, 18½ per cent.; for the half-year ending with June, 24 per cent., and for the 12 months ending with June also 24 per cent. less than last year.

For the half-year and the fiscal year ending with June the number arriving has been for seven years:

Year.	Half-year.	Year.	Year.	Half-year.	Year.
1878-79.....	99,224	177,826	1882-83.....	321,845	603,322
1879-80.....	263,726	457,257	1883-84.....	271,483	518,502
1880-81.....	388,511	669,431	1884-85.....	205,321	*395,000
1881-82.....	441,065	788,992			

* Allowing 7,179 arrivals to the ports which have not yet reported.

Thus the arrivals for the last half year are less than in any other since 1879, but are twice as great as then. It is remarkable that the immigration should have been so large at a time when business has been dull and it has been so hard to get work, and is an indication that this country is likely hereafter ordinarily to receive more immigrants than before 1880. The largest numbers arriving before then in any single year were 427,833 in 1853-54, 404,806 in 1871-72, and 459,803 in 1872-73; in no other year so many as 400,000. We may compare the arrivals after the culmination in 1873 with those since the culmination in 1882, as follows:

Year.	Arrivals.	Arrivals.	Year.
1872-73.....	459,803	788,992	1881-82
1873-74.....	313,339	603,322	1882-83
1874-75.....	227,498	518,502	1883-84
1875-76.....	169,986	395,000	1884-85
1876-77.....	141,857		
1877-78.....	138,469		

In the three years from 1873 to 1876 the immigration fell off 63 per cent.; in the three from 1882 to 1885, only 50 per cent. Two and a third times as many arrived last year as in 1875-76. The decrease continued two years longer after 1873, but the reduction was not great—only 7 per cent. of the maximum arrivals in 1872-73. At that rate we shall have 340,000 immigrants in 1886-87, which would have been a heavy immigration previous to 1880.

A singular explanation of the reason why braked wheels are most apt to skid as the speed falls very low, viz., that "the tendency of the wheels to keep rolling is not so great when the revolutions become few per minute," was offered at the last meeting of the Western Railway Club, as reported in another column. With so many railroad men present, it is rather surprising that some one of them did not "rise to explain" the real reason; which is, not that the wheels have less rotating energy, but that the holding power, or "coefficient of friction," of the shoe becomes very much (four or five times) greater at a slow speed than at high speeds, as was very beautifully shown graphically in the Westinghouse-Galton experiments analyzed in our discussion of "The Maximum Efficiency of Brakes," in the *Railroad Gazette* of May 29 and 29, and familiar by repute at least to most railroad men.

If this were not so, the decreasing velocity of the wheel could have no such effect as that suggested. If the brake did not skid the wheel at the first instant of application, the wheel would, of necessity, continue to turn as long as there was any accumulated energy whatever tending to make it, or, in other words, until the train came to a dead stop.

Record of New Railroad Construction.

Information of the laying of track on new railroads in the current year is given in the present number of the *Railroad Gazette* as follows:

Atchison, Topeka & Santa Fe.—The Southern Kansas line is extended from Crisfield, Kan., west by south to Hazleton, 7 miles.

Augusta, Gibson & Sandersville.—Extended from Bath, Ga., southwest 10 miles.

Florida Southern.—Extended from Pemberton Ferry, Fla., southward 15 miles.

Kansas City, Clinton & Springfield.—Extended from Clinton, Mo., south to Deepwater, 8 miles.

Kansas & Gulf Short Line.—Extended from Wells, Tex., south 5 miles.

Onset Bay.—Track laid from Onset Bay station to Onset Bay, Mass., 1¼ miles.

Suffolk & North Carolina.—Extended from the Virginia line southward into North Carolina, 7 miles.

This is a total of 53¼ miles on 7 roads, making 1,272 miles thus far reported for the current year. The new track reported to the corresponding date for 14 years past has been:

Miles.	Miles.
1885.....1,272	1878.....941
1884.....1,712	1877.....830
1883.....2,761	1876.....1,046
1882.....5,473	1875.....594
1881.....2,924	1874.....913
1880.....2,525	1873.....1,966
1879.....1,187	1872.....3,372

This statement covers *main track only*, second or other additional tracks and sidings not being included.

The construction thus reported for seven months of 1885 is less than in any year since 1879, and has been exceeded in 7 of the 13 years included in the record. No long lines are now in progress, and it does not appear probable that the remaining five months will show any considerable increase.

NEW PUBLICATIONS.

From Chicago to San Francisco is the title of a folder issued by the Chicago, Milwaukee & St. Paul Co., which is one of the neatest publications of the kind we have seen. It gives a time-table of the train from Chicago to San Francisco, with a brief running account of the route, illustrated by condensed bird's-eye views and a profile showing the elevation of the chief points on the line. In a word, it supplies the traveler with much of the information for which he generally has to ask the trainmen, often without getting a satisfactory answer, and has evidently been prepared by some one who has studied the traveling public and its wants.

TRADE CATALOGUES.

Catalogue of the Clayton Air Compressors, Rock Drills and Mining Machinery. Clayton Air Compressor Works, Brooklyn, N. Y.

This catalogue contains full lists of the dimensions, weight, price and capacity of a great number of different styles and sizes of air compressors, as well as similar details for rock drills, electric hoisting apparatus, rock-breakers, hoisting engines, pumps, boilers, water pipe and other plant likely to be used in connection with compressed air apparatus. It is neatly prepared and full so far as it goes. It does not attempt to cover all kinds of plant required on works where air compressors are used, nor does it go as fully into the technical or engineering details connected with their use as one or two which we have seen, but this cannot reasonably be called a fault, as for its main purpose, to give information as to the qualities and cost of the plant which the makers have for sale, it is well suited.

Foreign Technical Notes.

Great activity is manifested in Germany in the improvement of steel sleepers—transverse and longitudinal—for railroads, and their use is extending; the transverse being generally preferred, but it does not appear proven, even with European prices for wood and steel, that there is any economy in the use of the latter for the purpose.

As to the relative merits of hard and soft steel for rails, the latest testimony in Germany leaves the matter of wear indeterminate, with the conclusion that the wear of rails depends more upon the impurity of the steel than upon its hardness or softness—a decision in favor of soft steel, since it is unquestionably safer.

Recent experiments on the firing-up of locomotives in Saxony by various methods, among which were the use of old waste with artificial blast, use of gas, and use of ordinary kindling, demonstrated that the cheapest and quickest—even with the high price of wood in Germany—was that by the simple and ancient method of a chunk of oily waste and plenty of kindling.

It has been proposed by an Italian engineer to establish a railroad rope ferry across the Straits of Messina very much on the same principle of the rope and chain tow-boats used on European rivers. The motive power proposed is a steam engine on the ferry-boat, which is to overhaul a cable lying on the bottom of the Straits. The cable passes between the two hulls which constitute the ferry-boat, and would have a length of about 3¼ miles, and is to be 37 mm. (1½ in.) in diameter.

The latest engine-houses in France are round with covered turn-tables, and the cost of houses for 54 engines, with two engines on each radial track, is 13,000 francs (\$2,600) per engine, against 14,000 francs (\$2,800) per engine for rectangular houses, and this without including cost of foundations—a result which does not compare very favorably with the cost of single stall ring houses, which are built very substantially in the United States, including foundations, for a maximum of \$1,200 per engine.

The same number of the *Organ* gives an illustrated description of the Lilliehöök method of steam-heating for trains, practiced on the Swedish and Saxon railroads, and found very satisfactory.

It may be briefly described as a ribbed steam-pipe passing longitudinally through a box under the car floor, from which registers allow the air heated by it to pass up into the car, the box forming at the same time a warm double floor. The hose connections between the cars in this system of heating are arranged to bend upward so that the condensation water collects in the ends of the car-pipes, and is blown off through automatic valves. In the Haag system, very generally used in Germany, the connecting hose hang down, and the coupling is somewhat similar to the Westinghouse, and contains the condensation blow-off. The Lilliehöök is said to be much less destructive to connecting hose, but looks, from the drawings, more difficult to couple.

The boiler pressure is reduced for the car-heating, and kept constant by a reduction valve, which can be immediately adjusted to any desired pressure.

The total cost of heating on this system on the Saxon roads, including cost of operating and repairs, and interest on the apparatus, is 3.54 cents per 100 kilometres of a compart-

ment, or 0.57 cent per 100 passenger miles in a fully loaded train.

A special method of repairs with cast brass for large and valuable castings which cannot well be spared while new ones are procured, such as cylinder saddles broken through a steam connection or other projecting part, has been devised by Herr Haas, Government Master Mechanic at Berlin, and is illustrated in the *Organ*.

The process is as follows: The main casting is cut off inside the crack to a fairly uniform line. A model is then made by means of the portion cut off to fit over the end of the break and make the necessary junctions with the adjoining parts of the machine. The lower half of the mold flask is fitted around the broken end of the casting and well secured to it, and the joint is sealed with clay. The model is then set into the flask over the broken end, on which it, of course, should lap a certain amount, and the molding is proceeded with. The upper half of the flask has, of course, a core fitting into the hollow of the broken end, if such there be. Before casting, the broken end is well warmed by a charcoal fire placed within, and the precaution is generally taken of boring several holes into the broken end around the part on which the patch takes hold, into which the fresh metal runs and forms lugs, making a firmer connection between the new and the old parts, though the chief reliance is on the shrinking of the new casting around the end of the old one. The heating of the old portion is done to avoid having this shrinking excessive and to prevent chilling.

Several repairs of this sort have been made by Herr Haas, with entire success, the parts still remaining in active use, though a considerable time has elapsed since the repairs were effected.

TECHNICAL.

Locomotive Building.

The Cleveland & Marietta shops in Marietta, O., recently turned out a new locomotive for the road.

The Schenectady Locomotive Works in Schenectady, N. Y., are running full upon orders for locomotives for several roads.

The Car Shops.

The St. Charles Car Co. in St. Charles, Mo., has taken a contract to build 300 coal cars for the Kansas City, Clinton & Springfield road. The cars are to be delivered within 60 days.

The Litchfield Car Co. at Litchfield, Ill., is building 2 palace horse cars on a new plan. They are intended for the transportation of racehorses, and are fitted with every possible appliance for the comfort and convenience of the horses and their attendants.

The Gilbert Car Co. in Troy, N. Y., is building 4 Mann boudoir sleeping cars to go to Australia.

Iron and Steel.

The Millerton Iron Co. is about to build a new blast furnace at Millerton, Dutchess County, N. Y. The furnace will be 50 ft. high and 9 ft. 6 in. bosh, and will use charcoal as fuel.

The Sterling Steel Works at McKeesport, Pa., which have been running for some time single turn, have started up double turn.

The Centre Mining Co. has been organized at Ironton, O., for the purpose of operating the iron mines and furnaces heretofore owned by W. B. Kelly & Son.

The Jefferson Furnace in the Hanging Rock district in Ohio has gone into blast.

The Helmbacher Forge & Rolling Mill Co. in St. Louis is running its works on a number of small orders.

The rolling mills of P. L. Kimberly & Co. at Sharon, Pa., started up recently, is now running full in all departments.

The New Albany Rail Mill in New Albany, Ind., is busy on a heavy contract to furnish rails and other material for the Cable Railroad in St. Louis.

Manufacturing and Business.

Mr. Frederick M. Wheeler, of the Knowles Steam Pump Works, has lately taken out a patent for an improved surface condenser, which dispenses with all forms of ferrules and packing for the tube-heads, and yet allows the tubes to expand and contract freely. The circulation of the condenser water is very active, making the cooling surface more efficient than in the usual form. The tubes are straight, and can be taken out, cleaned and replaced by unskilled labor. Mr. Wheeler's surface condenser will be introduced by the Lighthall Manufacturing Co., of 97 Liberty street, New York.

The Rail Market.

Steel Rails.—The market continues quiet with a fair demand for small lots, and quotations steady at \$27@27.50 per ton at mill for ordinary sections, and \$29@31 for light rails. Most of the mills are pretty well supplied with work for the summer, and are not inclined to push sales.

Rail Fastenings.—Quotations continue nominally at 1.90 cents per lb. for spikes in Pittsburgh; 2.40@2.80 for track bolts, and 1.60@1.70 for splice bars. These quotations, however, are considerably shaded on cash orders.

Old Rails.—The market for old iron rails is dull and prices variable, sales being reported at \$16.50@18 per ton at tide-water, according to quality. Old steel rails are still quoted at \$16@17 per ton in Pittsburgh.

Car Couplers.

The Lehigh Valley Railroad will give the automatic coupler invented by Mr. Thomas L. McKen a thorough test in actual service by placing it on a number of freight cars in actual use on the road.

A New Use for Air Compressors.

The Ingersoll Rock Drill Co. has recently closed a contract with the city of Philadelphia for three of its "straight-line" air compressors, similar in all essential respects to those so largely used for tunnel and foundation work, for use in forcing air under pressure into the water supply, according to the new system devised by Prof. Albert R. Leeds, which seems to be making rapid progress and which, after very successful experience with it at Hoboken, is to be applied to the Philadelphia water supply.

Iron Locomotive Cabs.

The Manhattan Elevated Railroad Co., of New York, has experienced considerable trouble ever since the road was opened, with the locomotive cabs shaking to pieces or rotting out. The life of a good wooden cab seldom exceeded five years. To obviate these difficulties the mechanical department has recently designed an iron cab from which great durability is expected. No. 12 sheet-iron is used, stiffened with angle irons. Wood is not used at all, except for fram-

ings to hold the windows. Formers have been made for bending the sheets on to the proper shape, and templates for laying the sheets out on, and the intention is to supply all engines with cabs of this description as fast as renewal is necessary.

Western Society of Engineers.

The 212th meeting was held in Chicago July 21. Mr. Wright was called to the chair.

Mr. Wright stated that in his paper on Ventilation of Stables, printed in Volume 4 of the *Journal*, there was an error on page 194. In line 21 the amount of air, 392.4 ft., is that which each horse would get per hour if the area of ventilator was one square foot; being 16 square feet, this amount should be multiplied by 16, the proper amount being 6,278.4 ft. Mr. T. P. Perkins, of Lynn, Mass., first called Mr. Wright's attention to this unaccountable error. The Society then adjourned.

Mr. L. P. Morehouse, Secretary, gives notice that the quarters of the Society have recently been moved to the rooms of the Permanent Exhibit of Building Materials, No. 15 Washington street, Chicago. Members and their friends are specially invited to visit and examine this valuable exhibit.

Iron and Steel Production in 1885.

The American Iron & Steel Association has received from the manufacturers complete statistics of the production of pig iron and Bessemer and open-hearth steel in the United States in the first half of 1885, together with the statistics of the stocks of pig iron on hand and unsold at the close of this period. In the first half of 1885 the total production of pig iron was 2,150,816 net tons of 2,000 pounds, against 2,267,021 tons in the first half of 1884 and 2,522,592 tons in the second half. The production of anthracite pig iron declined in the last half of 1884, as compared with the first half, but the production of charcoal and bituminous pig iron increased. In the first half of 1885 the production of all kinds of pig iron declined, as compared with the last half of 1884. The stock of pig iron on hand and unsold in the hands of makers or their agents at the close of the first half of 1885 amounted to 692,916 tons, against 593,000 tons at the close of 1884, and 533,800 tons at the close of 1883. The aggregate increase in the first half of 1885 was nearly 100,000 tons. From the close of 1884 to the end of June last charcoal stocks increased 25,908 tons; bituminous increased 114,406 tons, and anthracite decreased 40,398 tons; net increase, 99,916 tons. From these statistics the Secretary of the American Iron & Steel Association concludes that pig-iron manufacturers, especially the Western bituminous makers, have been making too much pig iron during the first half of the present year. The rolling-mill troubles in the west are doubtless wholly responsible for the accumulation of bituminous stocks.

The production of Bessemer steel ingots in the first half of 1885 was 763,344 net tons, against 723,650 tons in the second half of 1884, and 816,945 tons in the first half of 1884. As compared with the last half of 1884, the half-year just closed shows a gain of 39,694 net tons, which is due in part to the demand for Bessemer steel rails and other purposes. As compared with the first half of 1884, however, the first half of 1885 shows a decrease of 53,601 net tons. The production of Bessemer steel rails in the first half of 1885 was 452,446 net tons, against 523,251 tons in the last half of 1884, and 593,370 tons in the first half. The falling off, as compared with the first six months of 1884, was 140,924 net tons, and, as compared with the second six months, it was 70,805 tons. The production of open-hearth steel ingots in the first six months of 1885 was 68,838 net tons, against 59,873 tons in the second half of 1884, and 71,744 tons in the first half.

The Mann Boudoir Cars in Australia.

An order has just been given to the Gilbert Car Works in Troy, N. Y., for the construction of 4 Mann boudoir cars of the most elaborate and handsome character, for the South Australian Railway. Work has already been begun on the cars, which are to be built in sections for shipment, and are intended to be the best types of the Mann car yet turned out. They are to be delivered in four months. This order was given after careful investigation, by a commission appointed by the administration of the South Australian government lines, to determine the best sleeping-car that can be obtained. This commission visited this country last year, and also went to Europe.

The use of the Mann cars is extending, the company now having 43 cars in regular operation, while others are called for. The Mann cars have recently begun regular service on the Boston & Lowell lines to the White Mountains, and the line heretofore running between Chicago and Detroit has been extended to London, Can., over the Great Western Division of the Grand Trunk.

The First Railroad in America.

In the course of a paper read before the Franklin Institute, bearing the title "Transportation Facilities of the Past and Present," Mr. Barnet Le Van corrects the commonly received statement that the Granite Railroad, built at Quincy, Mass., in 1827, by Gridley Bryant, for transporting stone for the Bunker Hill Monument from the granite quarries of Quincy, was the first railroad built in the United States. On this point he presents interesting testimony to prove that, far from being the first, the Granite Railroad was really only the fourth in order of precedence in the United States. We quote from that portion of the paper relating to the subject as follows:

"Railroads were also first introduced in Pennsylvania. In September, 1829, the first experimental track in the United States was laid out by John Thomson (the father of John Edgar Thomson, who was afterward the President of the Pennsylvania Railroad Co.), Civil Engineer of Delaware County, Pa., and constructed under his direction by Somerville, a Scotch millwright, for Thomas Leiper, of Philadelphia. It was 180 ft. in length, and graded 1½ in. to the yard. The gauge was 4 ft., and the sleepers 8 ft. apart. The experiment with a loaded car was so successful that Leiper in the same year caused the first practical railroad in the United States to be constructed for the transportation of stone from his quarries on Crum Creek to his landing on Ridley Creek, in Delaware County, Pa., a distance of about 1 mile. It continued in use for 19 years. Some of the original foundations, consisting of rock in which holes were drilled and afterward plugged with wood to receive the spikes for holding the sleepers in place, may be seen to this day."

Cost of Lighting Cars by Pintsch Gas in Germany.

From certificates from several operating bureaus (Betriebsämter) of Prussian state railroads, the following data are obtained: The Magdeburg Bureau, which uses the Pintsch gas exclusively for passenger, baggage and mail cars, and to some extent for headlights and in locomotive cabs and on tenders, reports 1,371 compartments of 310 passenger cars lighted by 922 lights with argand burners ½ in. diameter cost 0.97 cent per light per hour when fed with rape-seed oil; while 3,423 compartments of 781 passenger cars were lighted by 2,303 gas-lights consuming 0.78 cubic feet each per hour at a cost, including interest on the cost of the gas-works, of 0.64 cent per hour per light. The comparative illuminating power of each light is not mentioned by the Bureau.

The Breslau Operating Bureau says the average cost of an

oil lamp, consuming 0.11 lb. of oil per hour, to have been 0.7 cent; while the cost of a Pintsch gas-light, burning 0.7 to 0.9 ft. per hour, was 0.15 to 0.19 cent. Oil cost 6.4 cents per pound; Pintsch gas, \$2.20 per 1,000 feet.

The Berlin Bureau reports the cost per light to have been (exclusive of interest on plant) 0.45 cent for gas and 0.96 cent for oil per light in 1881 and 1882, when 857 cars, with 2,738 lights, burned gas, and 297 cars, with 723 lights, burned oil. The cost of gas was \$4 per 1,000 ft.; of rape-seed oil, 7.27 per pound. It makes the very important observation that the Pintsch gas-light is perfectly steady, and three times as powerful as the oil light. The cost of cleaning and caring for the lights averaged 36½ cents per year for gas and \$4.02 for oil. Including interest on the cost of the plant and a sinking fund to renew it, the cost was about 1½ cents per hour per light for either oil or gas, "but the gas has the advantage of producing a light three times more powerful, of cleanliness, simplicity and ease of handling, the latter especially distinguishable in lighting and extinguishing the lights at a by-station and temporary stopping."

Brake Tests.

An interesting exhibition of the working of the patent brakes for locomotives and freight trains of the American Brake Co., of St. Louis, was given yesterday afternoon on the New York & New England Railroad, between Boston and Norwood. The exhibition was conducted by Mr. George H. Poor, Superintendent of the company (who, by the way, was formerly Master Mechanic of the Portland & Ogdensburg Railroad), assisted by General John B. Gray, of New York, the Vice-President, and by Mr. Robert E. Libbey, Eastern Agent. It was witnessed by officials of the New York & New England; Old Colony; Boston & Albany; Boston & Maine; Fitchburg; Boston & Lowell; Boston & Providence and the Boston, Revere Beach & Lynn railroads, and by several prominent citizens.

There are two brakes, one for the locomotive drivers and tender and the other for the cars. The locomotive brakes are applied by a steam cylinder between the drivers and another under the tender. This invention is now in use on 1,100 locomotives belonging to 120 roads. The Boston & Albany; Old Colony; New York, New Haven & Hartford and Connecticut River railroads have them. So it was to show the train brake, more especially, that an entire train of the Wabash road, consisting of locomotive and tender, 12 loaded coal cars and two box cars, was brought East. One of the box cars had openings in the floor which permitted a good view of the brake in action, and there were gauges which showed at once the speed of the train, the distance run after applying the brake and the number of pounds pressure applied. Division Superintendent Allen had with him a stop watch by which he timed each test, and a profile of the road which showed the grade at each place. The length of the train was 600 ft. and its weight was stated to be 391 tons. The following table shows the results of the seven stops made:

No.	Speed. Miles per hr.	Time. Seconds.	Distance. Feet.	Grade. Ft. to mile.
1.....	20	32	304	34
2.....	28	40	833	18½
3.....	32	40	1,161	34
4.....	25	29	547	Level
5.....	25	35	670	17 4-10
6.....	24	15	349	*47½
7.....	30	47½	1,088	36

* Up grade.

All these stops were considered by the railroad men present as having been made in remarkably quick time, and with such steadiness throughout the train that there was no jolting. One official said that the stop which was made in 547 ft. on a level, when the speed was 25 miles an hour, could not have been made with hand brakes applied by three men in less than 2,500 ft.

This is an automatic momentum brake, operated by the drawbar, and is on the same general principle as the Rote brake and the Turner-Beard brake. It consists of but few parts, and it is claimed to be unfailling in its work, going in either direction, whatever the grade or condition of track, regardless of cars in the train not equipped with it, and never affected by dust, snow or ice. When the engineer brakes his locomotive, the drawbars throughout the train are pushed in, and these strike a dog just in rear of each, which engages an attachment that applies the ordinary brake by power from the revolution of the axle, the pressure, of course, diminishing as the momentum draws to a close. The device is so adjusted that not enough pressure is ever applied to cause the wheels to slide. The brakes are released when the pressure on the drawbars ceases, so the train is ready at once to start again. The automatic adjustment of the brake for working is made by the centrifugal action of a sort of spring governor fastened to the axle. This does not put the dog behind the drawbar into position to apply the brake until a speed of 6 or 8 miles an hour has been attained, but it is claimed that up to that time the engineer has perfect control of his train by means of his locomotive and tender brake. Thus it will be seen that this brake will not work while cars are being set out upon sidings or switched in yards where it is not required; but on the road will enable the engineer to control his train, thus making high speed for freight trains far safer than low speed is now, and with a smaller crew. This brake has already been applied to 2,000 cars of the St. Louis & San Francisco, and to 7,000 cars of the Wabash, and is certified by those companies as doing all that is claimed for it.

The train left last evening for Springfield, Albany, Jersey City, Philadelphia, Baltimore, Cincinnati and St. Louis. It was a gratification to the railroad officials present to see tests made with a loaded train and under the conditions of ordinary railroad operation.—*Boston Advertiser*, July 24.

Underground Railroad in Italy.

An underground line is to be built in Naples, the largest city in Southern Europe. The stations, etc., are to be lit by electric light.

Cast-Iron Smoke-Stacks.

The Richmond & Danville Railroad is replacing sheet-iron stacks as fast as they wear out with cast stacks weighing 345 lbs., and cast in dry sand. The base weighs 85 lbs. additional, and is cast in green sand. No difficulty is found in making perfectly smooth castings ½ in. thick, and sometimes thinner. The cost of stack and base is about \$12, being much less than that of sheet-iron stacks with cast-iron bases and tops. The dimensions are: Extreme height above sheet of smoke-box, 5 ft.; interior diameter at top, 20½ in.; at throat, 14½ in. They are curved at the bottom to a form well calculated to facilitate draft.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:
St. Paul, Minneapolis & Manitoba, annual meeting, at the office in St. Paul, Minn., Aug. 20.
Terre Haute & Indianapolis, special meeting in Terre Haute, Ind., Aug. 16.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Chicago & Alton, 2 per cent. quarterly, payable Sept. 1, to stockholders of record on Aug. 10.
Cleveland & Pittsburgh (leased to Pennsylvania Co.), 1½ per cent., quarterly, payable Sept. 1.
North Carolina (leased to Richmond & Danville), 3 per cent., semi-annual, payable Sept. 10.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Master Car-Painters' Association* will hold its annual convention in Toronto, Ont., on Wednesday, Sept. 2.
The *National Association of General Passenger & Ticket Agents* will hold its next half-yearly meeting in New York, at 11 a. m., on Tuesday, Sept. 15.
The *Brotherhood of Locomotive Firemen* will hold its annual convention in Philadelphia, on Monday, Sept. 21.
The *General Time Convention* will meet at the Grand Pacific Hotel in Chicago, on Thursday, Oct. 8.
The *Southern Time Convention* will meet at the National Railway Exchange, No. 46 Bond street, New York, on Wednesday, Oct. 14.

Foreclosure Sales.

The *Cincinnati, Columbus & Hocking Valley* road was sold in Cincinnati, July 11, under a decree of foreclosure of mortgage and bought for \$20,000, by Francis A. Riddle, of Chicago, representing some of the bondholders. The road extends from Jeffersonville, O., west to Claysville Junction, 28 miles, and was built in 1882 with the intention of making it part of a new line from Cincinnati to Columbus. The floating debt by the last report consists of \$560,000 first-mortgage bonds and \$560,000 income bonds. The line has not been operated regularly and has never earned its running expenses.

Master Car-Painters' Association.

Mr. John Rattenbury, President, and Robert McKeon, Secretary, of the Master Car-Painters' Association, give notice that the sixteenth annual convention will be held in Toronto, Can., on Wednesday, Sept. 2, beginning at 10 a. m. The session will continue until Friday, Sept. 4. The Rossin House has been selected as the headquarters of the Association, and the meeting will be held in its parlors. The hotel will make a special rate to delegates of \$2.50 per day. Members desiring to engage rooms should apply to the clerk of the hotel.

The circular says: "A general invitation is cordially extended to Master Car and Locomotive Painters throughout the United States and Canada to meet with us in convention, and also to become members of the National Association."

"The annual meetings of this Association are full of interest to every foreman car-painter, and the benefits to be derived from an interchange of views, and the friendly discussion of methods employed, as well as the management of the paint shop, cannot fail to aid every foreman in the discharge of his duty, and result in benefit to the railway companies for whose interest we labor."

"It is especially requested that delegates devote the entire time each day to the discussion of the several subjects which will be introduced by the committees, who have had ample time for preparation, and some valuable papers may be expected from them."

"Subjects No. 1, 2, 4, 6 and 8 are more particularly for general discussion, and delegates will have opportunity of giving their views on each subject. The officers hope that those intending to be present at the convention will take an interest in the questions, and be prepared to respond with some practical remarks when called upon."

"The officers of the Master Car-Painters' Association would respectfully request that master mechanics and master car-builders assist the foreman painters of their respective roads in procuring free transportation to the convention."

"Any member of a committee unable to attend will please forward their papers or reports to the Secretary, five days previous to the meeting."

"The following list of subjects will be brought before the convention:

"1. *Why do Paints and Varnishes Crack, and what is the reason that Cracks in the latter are usually at Right Angles to the Grain of the Wood?* A. P. SWEET, Detroit, Lansing & Northern Railroad, Ionia, Mich.

"2. *The Inside Finish of a Passenger Car, from the Foundation to the Finish, including Wood Head Linings.* T. F. PAGE, Laconia Car Works, Laconia, N. H.

"3. *The Paint Shop of Fifty Years Ago and the Paint Shop of To-Day.* D. D. ROBERTSON, Michigan Central Railroad, Detroit, Mich.

"4. *Is a Car Body Color Composed of One Durable Pigment More Durable Than a Color Composed of Two or More Pigments?* C. E. COPP, Boston & Maine Railroad, Lawrence, Mass.

"5. *A Few Thoughts on the Outside Painting and Varnishing of Railway Cars.* WM. DAVIS, Canada Southern Railway, St. Thomas, Ont.

"6. *Is it Practical to prepare the Painting of a Passenger Car, up to the First Coat of Body Color, before placing on the Car; also on Freight Cars up to the Last Coat of Color?* JOS. MURPHY, Louisville & Nashville Railroad, Louisville, Ky.

"7. *Piece Work in the Railway Paint Shop.* F. S. BALL, Pennsylvania Railroad, Altoona, Pa.

"8. *What is the Best Method of Cleaning Brass and Plated Car Trimmings?* E. L. FETTING, New York & New England Railroad, Norwood, Mass."

ELECTIONS AND APPOINTMENTS.

Almaden & Saratoga.—The officers of this new California company are: D. M. Pyle, President; Peter Ball, J. K. Carter, L. A. Sage, directors; J. C. Winans, Secretary and Treasurer.

Atlanta & West Point.—At the annual meeting in Atlanta, Ga., July 25, the following directors were chosen: W. B. Berry, J. S. Bigby, J. A. Davis, J. W. Green, L. P. Grant, W. G. Raoul, D. N. Speer. The board re-elected L. P. Grant President; Cecil Gabbett, General Manager; H. M. Abbott, Secretary and Treasurer.

Buena Vista & Ellaville.—At the annual meeting in Ellaville, Ga., July 24, the following directors were chosen: Robert Clemens, H. W. Cockrell, Malcolm Hair, Thomas Harvey, James M. Lowe, J. R. McMichael, E. W. Miller, W. D. Murray, Du Pree Peacock, A. J. Pursely, Joseph Rodgers, B. A. Strange.

Cincinnati, Lebanon & Northern.—The following have been chosen directors of this company, successor to the Cincinnati Northern: George Hafer, A. D. Bullock, George Wilshire, John F. Winslow, I. D. Brown. The directors have elected George Hafer President; J. F. Winslow, Secretary.

Cleveland, Columbus, Cincinnati & Indianapolis.—Mr. Wm. Garstang is appointed Master Mechanic of the Indianapolis & St. Louis road, and the Indianapolis Division, with headquarters at Brightwood, Ind., vice T. W. Ranson, resigned to accept a position elsewhere. Mr. E. Hudson, late

General Foreman of Cleveland shops, is appointed Master Mechanic of the Columbus and Cincinnati divisions, with headquarters at Cleveland, O., vice Wm. Garstang, transferred. Appointments to take effect Aug. 1.

Houston, East & West Texas.—In the United States Circuit Court in Shreveport, La., July 25, Mr. Simon Levy was appointed Receiver for the Shreveport & Houston road, which is the Louisiana section of this line.

Los Angeles & San Gabriel Valley.—The officers of this new company are: President, J. F. Crank; Vice-President and General Manager, S. P. Jewett; Secretary and Treasurer, S. Washburn. Office in Los Angeles, Cal.

New Brunswick.—The following orders from General Manager F. W. Cram, are dated St. John, N. B., July 15: "Mr. Moses Burpee is hereby appointed Chief Engineer for this company, with headquarters at Woodstock, N. B. He will have entire charge of the Maintenance of Way Department of the line. By this order, all track, bridge, fence and station repair forces are placed directly in his charge, and heads of these departments will report to him accordingly."

"Mr. G. A. Haggerty is hereby appointed Mechanical Superintendent for this company, with headquarters at McAdam Junction. He will have entire charge of the rolling stock of the line. By this order, machine and car shops, at all points, are placed in his charge, and foremen in these departments, as well as engine-men—when not on trains—are made subordinate to him."

Ohio & Mississippi.—The office of General Master Mechanic F. W. Stapf has been removed from Cincinnati to Vincennes, Ind., where the principal shops of the road are.

Philadelphia & Reading.—Mr. John Cassidy has been appointed Superintendent of Signal Towers and Crossings of this road. He has been a train dispatcher on the road for several years.

Pittsburgh, Cincinnati & St. Louis.—Mr. George W. Davis is appointed Division Freight Agent of this company in charge of the Cincinnati & Muskingum Valley Division, vice Mr. Robert B. Bailey, resigned. His office will be at Zanesville, O.

Pittsburgh & Western.—The following from General Manager Thomas M. King is dated Allegheny, Pa., July 1: "The title of Mr. C. W. Bassett, which has heretofore been Assistant General Passenger Agent, has this day been changed to General Passenger and Ticket Agent. Please address him accordingly."

Rutland.—At the annual meeting in Rutland, Vt., July 23, the following directors were chosen: Charles Clements, P. W. Clements, Rutland, Vt.; John W. Stewart, Middlebury, Vt.; Bradley B. Smalley, Wm. Wells, Burlington, Vt.; George H. Ball, Worcester, Mass.; George M. Barnard, James Q. Sargent, Boston.

Texas Traffic Association.—The organization of this new pool is as follows: Commissioner, J. Waldo, with office at Galveston. Executive Committee, George Sealy, Gulf, Colorado & Santa Fe; A. C. Hutchinson, Southern Pacific; Charles Dillingham, Houston & Texas Central; W. H. Newman, Texas & Pacific; H. M. Hoxie, Missouri Pacific; L. B. Fish, Texas & St. Louis.

Union Pacific; Chicago, Milwaukee & St. Paul; Chicago, Rock Island & Pacific; Chicago & Northwestern.—The following joint circular from these four companies is dated Chicago, July 20: "Mr. George W. Hibbard is appointed Australian Passenger Agent of the above lines, with headquarters at Sydney, N. S. W. Appointment to take effect Aug. 1, 1885."

PERSONAL.

—Mr. George F. Tyler has resigned his position as director of the Norfolk & Western Co., to take effect August 1.

—Mr. George A. Baker has resigned his position as Superintendent and General Freight and Passenger Agent of the Lackawanna & Pittsburgh road.

—Mr. Charles H. Phinizy, President of the Georgia Railroad & Banking Co., was married in Rome, Ga., July 28, to Mrs. Mary Louise Yancey Phinizy.

—It is again reported from Chicago that Mr. Alexander Mitchell will shortly resign his position as President of the Chicago, Milwaukee & St. Paul Co. This report has been sent out several times before, and is hardly to be accepted without further corroboration.

—It is reported that Mr. Philip D. Armour, of Chicago, who was chosen a director of the Chicago, Milwaukee & St. Paul Co. at the last election, and is understood to be a very large holder of its stock, will succeed Mr. Mitchell as President of the company. Mr. Armour himself does not confirm the report.

—Mr. Henry A. Roworth, for 50 years past employed as a locomotive engineer on the South Carolina Railroad, retires from his position Aug. 1, on account of increasing age and infirmities. Mr. Roworth is 75 years old, and has been longer in active service than any other locomotive engineer in the United States.

—The new Receiver of the Toledo, Cincinnati & St. Louis has requested General Superintendent E. P. Murray, General Freight Agent A. H. Snider, Division Superintendent W. H. Vandegriff and Cashier W. F. Aiken to resign their respective positions, and their resignations have been tendered accordingly, to take effect Aug. 1. It is said that their places will not be filled, the Receiver's intention being to run the road with the smallest possible force of officers.

—Mr. Peter H. Watson died in New York, July 22, aged 68 years. His death resulted from a general breaking up of the system, said to be due to overwork. Mr. Watson was born in Canada, but when a boy came to the United States, where he learned and for some time practiced the profession of civil engineer. Later he studied law and settled in Washington, where he had a very large practice as a patent lawyer. In 1862 he was appointed Assistant Secretary of War under Secretary Stanton, and held that position for nearly four years, having special charge of the Quartermaster's and Ordnance division of the office. On resigning this office he returned to his practice as a patent lawyer, and afterward became largely interested in railroads, especially in Ohio and Pennsylvania. He was also interested in the oil business, and was one of the organizers of the South Improvement Co., which made such a stir in the oil regions some 14 or 15 years ago. In July, 1872, he was chosen President of the New York, Lake Erie & Western Co. Great expectations were entertained of his administration, but it was in some respects a disappointment to the stockholders, and he retired after two years' service, in 1874. He again returned to his professional practice, and was also concerned in some manufacturing business. Mr. Watson was an extremely energetic man, and a very hard worker. He leaves a widow and four children, all grown up. His funeral took place at Ashtabula, O., where his family resided.

TRAFFIC AND EARNINGS.

Railroad Earnings.

Earnings of railroad lines for various periods are reported as follows:

Six months to June 30:	1885.	1884.	Inc. or Dec.	P. c.
Balt. & Potomac.	\$655,242	\$577,801	I.	\$77,081 13.3
Net earnings.	251,171	170,519	I.	80,652 47.2
Mobile & Ohio.	925,948	976,386	D.	50,438 5.2
N. Y., Sus. & W.	496,115	451,928	I.	44,187 9.8
Northern Cent.	2,597,772	2,620,255	D.	22,483 0.9
Net earnings.	1,043,175	948,343	I.	94,832 10.0
Ohio & Miss.	1,752,868	1,827,355	D.	75,067 4.1
Pennsylvania.	21,319,600	23,333,256	D.	2,013,656 8.6
Net earnings.	6,519,658	8,112,040	D.	1,592,382 19.6
Phila. & Reading.	12,710,202	14,218,663	D.	1,508,461 10.6
Net earnings.	4,719,136	5,506,838	D.	787,702 14.3
St. Jo. & West.	491,255	.....	.....	.....

Month of June:	1885.	1884.	Inc. or Dec.	P. c.
Balt. & Potomac.	\$103,957	\$101,965	I.	\$1,992 1.9
Net earnings.	35,380	29,218	I.	6,162 21.2
California South.	8,681	7,925	I.	756 9.6
Mobile & Ohio.	115,270	140,036	D.	24,766 17.7
N. Y., Sus. & W.	90,222	82,970	I.	7,252 8.7
Northern Cent.	416,219	416,635	D.	416 0.1
Net earnings.	136,929	136,629	D.	300 0.2
Ohio & Miss.	278,654	280,163	D.	1,509 0.5
Pennsylvania.	3,735,639	3,906,175	D.	170,536 4.3
Net earnings.	909,437	1,083,019	D.	173,582 18.0
Phila. & Reading.	2,428,293	2,148,763	I.	279,530 13.0
Net earnings.	943,456	897,927	I.	45,529 5.1
St. Jo. & West.	65,111	90,342	D.	25,231 27.9

Third week in July:	1885.	1884.	Inc. or Dec.	P. c.
Canadian Pacific.	\$207,000	\$125,000	I.	\$82,000 65.6
Chicago & Alton.	170,937	185,003	D.	14,066 7.6
Chi. & East Ill.	28,293	31,787	D.	3,494 10.9
Chi., Mil. & St. P.	423,000	439,541	D.	16,541 3.7
Chi. & Nor'west.	472,900	452,900	I.	20,000 4.5
Chi., St. P., Min. & Omaha.	102,900	105,400	D.	3,100 2.9
Cin., Ind., St. L. & Chi.	30,416	47,253	D.	10,837 23.0
Det., Lan. & No.	19,269	18,216	I.	1,053 5.8
Illinois Central.	181,700	176,304	I.	5,396 3.1
Iowa lines.	34,300	32,807	I.	1,493 4.5
Long Island.	95,180	88,664	I.	6,516 7.3
Louisv. & Nashv.	214,250	244,335	D.	10,085 4.1
Mil. & S. & W.	24,575	23,550	I.	1,025 4.3
Mil. & Northern.	10,226	9,347	I.	879 9.5
Roch. & Pitts.	26,995	24,826	I.	2,169 8.8
St. L. & San F.	74,400	79,082	D.	4,682 5.9

Weekly earnings are usually estimated in part, and are subject to correction by later statements. The same remark applies to early statements of monthly earnings.

Coal.

Coal tonnages for the week ending July 18 are reported as follows:

	1885.	1884.	Inc. or Dec.	P. c.
Anthracite.	747,006	127,388	I.	619,618
Eastern bituminous.	171,711	185,377	D.	13,666 7.3
Coke.	50,708	51,619	D.	911 1.8

The anthracite tonnage compares with a week of short production last year. The tidewater stocks are increasing largely, and there is still some talk of an agreement to limit production further. It is said, however, that neither the Reading nor the Lackawanna will agree to such an arrangement.

Pennsylvania Railroad coal tonnage for the week ending July 18 was:

	Coal.	Coke.	Total.	1884.
Line of road.	135,568	50,112	185,680	184,230
From other lines.	68,882	596	69,478	58,883
Total.	204,450	50,708	255,158	243,122
Year to July 18.	5,791,294	1,383,080	7,174,374	7,130,477

Increase for the week, 12,036 tons, or 4.9 per cent.; increase for the year, 43,897 tons, or 0.6 per cent.

Cumberland coal shipments for the week ending July 18 were 50,763 tons. Total to July 18 this year, 1,420,904; last year, 1,469,692; decrease, 48,788 tons, or 2.7 per cent.

The Tennessee Coal, Iron & Railroad Co., for the six months to June 30, shipped 76,036 tons of coal and 50,366 tons of coke. The company is now increasing the number of its coke ovens one fourth.

Pennsylvania Railroad coal tonnage for the week ending July 25 was:

	Coal.	Coke.	Total.	1884.
Line of road.	134,295	49,185	183,480	186,379
From other lines.	68,925	502	69,427	58,639
Total.	203,190	49,747	252,937	245,018
Year to July 25.	5,994,484	1,452,827	7,427,311	7,375,495

Increase for the week, 7,919 tons, or 3.2 per cent.; increase for the year, 51,816 tons, or 0.7 per cent.

Cumberland coal shipments for the week ending July 25 were 60,513 tons. Total to July 25 this year, 1,490,417; last year, 1,535,528; decrease, 45,111 tons, or 2.9 per cent.

Cotton.

Cotton movement for the week ending July 24 is reported as follows, in bales:

	1885.	1884.	Inc. or Dec.	P. c.
Interior markets:				
Receipts.	2,687	997	I.	1,690 169.5
Shipments.	3,978	4,111	D.	133 3.2
Stock, July 24.	22,300	25,130	D.	2,830 11.3
Seaports:				
Receipts.	2,194	2,800	D.	606 2.1
Exports.	8,058	20,572	D.	12,514 60.8
Stock, July 24.	223,132	235,605	D.	12,473 5.3

The total shipments from plantations for the cotton year (from Sept. 1) to July 24 are estimated at 5,592,976 bales, against 5,643,063 last year, 6,934,332 in 1882-83, and 5,331,178 in 1881-82.

Colorado & California Association.

The organization of the new Colorado & California Association was completed in Chicago, July 23, by the selection of Mr. George H. Daniels as Commissioner, with headquarters at Denver. Mr. Daniels is also Commissioner of Colorado & Utah Association. The Southern Pacific was given permission to enter the association. Under the new agreement the new pool is to be for two years, any line of the association to have the privilege of demanding a readjustment of division at the end of six months.

Petroleum.

The production and shipments of the Pennsylvania and New York oil wells for June are given by *Stowell's Petroleum Reporter* as below, in barrels of 42 gallons:

	1885.	1884.	Inc. or Dec.	P. c.
Production.	1,767,210	1,862,190	D.	94,980 5.1
Shipments.	2,034,025	1,827,555	I.	206,470 11.3
Stock, June 30.	35,872,257	38,665,838	D.	2,793,581 7.2
Producing wells.	22,384	21,658	I.	726 3.4

Of the total production the Allegheny District in New York furnished 13.3 per cent.; the Bradford District in Pennsylvania, 40.8; the Warren District, 12.3, and the Lower District, 33.6 per cent. The total production is larger than that of any month so far this year, except April, but was exceeded in ten months of last year and in every month of 1883.

Shipments again exceeded the production, and were larger than in any previous month this year except May.

The stock on hand was diminished by 266,515 barrels,

which is the excess of shipments over production for the month.

There were 242 new wells completed during the month, and 48 dry holes, or failures to find oil, were reported. At the close of the month there were 209 new wells in process of drilling and 147 rigs building.

The shipments of oil for the month were as follows:

	Crude.	Refined.	Total.	P. c.
New York.....	505,642	91,797	596,935	29.4
Philadelphia.....	567,027	68,236	635,263	31.2
Baltimore.....	118,337	6,185	124,522	6.1
Boston.....	17,360	106,551	123,911	6.1
Cleveland.....	242,083	.....	242,083	11.9
Pittsburgh.....	69,391	.....	69,391	3.4
Local points.....	212,865	28,545	241,410	11.9
Refined at Creek re-	.....	.....	.....	.....
fineries.....	300,810	.....	.....	.....
Total.....	2,034,025	300,810	2,034,025	100.0

In this statement the refined oil shipped is that refined at creek refineries; it is reduced to its equivalent in crude oil, so that the total represents the amount of crude oil shipped to each point named, whether sent in crude or in refined form.

Texas Pool.

The meeting of Texas railroad managers on July 23 reached an agreement for a general pool on all Texas business, to continue for five years. It was understood on that day that only a few details remained to be completed. Naturally, in forming so comprehensive a pool there were a great many questions to be settled, and much discussion was required.

Mr. Waldo, of the Houston & Texas Central, was selected as Pool Commissioner. He has been with that road for nineteen years, and was for nine years General Passenger Agent and for four years General Traffic Manager, and at present holds the position of Agent for the Receiver. He probably understands Texas business more thoroughly than any other man.

On July 24 the conference completed the organization of the Texas Traffic Association, with Mr. Waldo as Commissioner and an executive committee composed of one member from each company. This committee will have power to fix rates and act generally on all questions arising under the pool.

The agreement has not been made public, but it is understood that it contains clauses forbidding rebates to shippers and all forms of discrimination, and providing for placing all business at each competitive point in the hands of a single agent. The division of business has not been completed as yet, as it will take some time to figure out the percentages.

The general freight agents of the roads will meet shortly to settle rates and attend to similar matters.

The roads in the Association are the Texas lines of the Missouri Pacific; the Atlantic System of the Southern Pacific; the Houston & Texas Central; the Texas & Pacific; the Gulf, Colorado & Santa Fe and the Texas & St. Louis.

Transportation of Corpses.

At the meeting of the National Association of General Baggage Agents, held at St. Paul recently, the following resolutions were adopted on the report of a committee:

"The transportation of the bodies of persons dead of small-pox, Asiatic cholera or yellow fever shall be absolutely forbidden.

"All other dead bodies may be transported, provided they are encased in an antiseptic interment sack, hermetically sealed, in addition to being in a coffin, and this inclosed by a tight wooden box.

"Every dead body must be accompanied by a certificate of death from a physician or board of health, and a written certificate from the shipping undertaker that the corpse has been prepared for transportation strictly in accordance with Rule No. 2."

The committee further recommends that a form of certificate be drawn out which both the physician and undertaker will be required to fill out, which will make it an impossibility for them to smuggle bodies dead from contagious diseases into baggage cars for transportation without leaving themselves open to prosecution.

Trunk Line Meeting.

At a meeting of the Trunk Lines Executive Committee in New York, July 28, the west-bound freight pool was continued for one month, or until Sept. 1. Nothing was done on the question of rates.

Southern Railway & Steamship Association.

The Executive Committee met in New York, July 29, and spent the day in general discussion of the situation, but no action was reached. The meeting was expected to continue for several days.

Northwestern Traffic Association.

A dispatch from Chicago, July 29, says: "Trouble in the Northwestern Traffic Association over the possible competition of the Fargo Southern Railway has been averted by the decision of the Chicago, Milwaukee & St. Paul, which has acquired control of the Fargo Southern, to put the business from common or competing points with the St. Paul, Minneapolis & Manitoba into the pool, the same as heretofore. This means that in order to avoid any difficulties the Milwaukee & St. Paul will allow business from competing points on the Fargo Southern to be divided among the various roads in the Northwestern Traffic Association."

Tea Over the Northern Pacific.

The Northern Pacific Co. has secured the shipment to Portland, Or., of a steamer load of tea, about 2,000 tons in all. This tea will be shipped eastward in special trains, under an agreement that they shall cover the distance between Portland and St. Paul in 160 hours, and special freight rates are also given. This is the first shipment of tea made over the Northern Pacific line.

Central Passenger Committee.

Under date of July 21 the Cleveland, Columbus, Cincinnati & Indianapolis Co. gave notice of the withdrawal of its lines from the Central Passenger Committee, to take effect in 30 days. A later dispatch, however, says that the company has consented to withhold this notice and to continue to act with the committee at least until the investigation of certain charges made is completed.

Passenger Rates.

The Baltimore & Ohio Co. has commenced cutting emigrant rates, having announced this week a rate of \$1 for emigrant tickets from Baltimore to Chicago. The \$1 rate will be extended to all points reached by the company's own lines. A report that the Pennsylvania had restored its emigrant rates is denied.

RAILROAD LAW.

What Constitutes a Public Railroad.

In the complaint of the selectmen of the town of Wareham against the Onset Bay Grove Association, the Massachusetts Railroad Commissioners have given the following decision, which is of interest from its clear statement of what constitutes a public railroad, subject to the control of the state:

The selectmen of Wareham complain that the association had constructed and is operating a railroad in that town without any lawful authority, and ask the board to intervene un-

der the provisions of section 15 of chapter 112 Public Statutes.

The road was constructed wholly on the land of the respondents from a point near the Old Colony railroad to a central point in the grove, and is a little over a mile long. It was built in good faith, without any special authority, in the belief that no such authority was needed. It was constructed and equipped for operation by steam power, and is intended, as its managers say, both for freight and passenger traffic.

The law as to railroads for private use is contained in sections 223 and 224, chapter 112, and is in brief as follows: "A person or corporation may construct a railroad for private use in the transportation of freight," provided that it shall not be "constructed across or upon a highway, town-way or traveled place, without the consent of the * * * selectmen of the town, nor except in a place or manner approved by them. If they consent they may from time to time regulate the motive power, speed and time and manner of use. If they allow the use of steam power, the general law as to the crossing of ways and traveled places shall apply, i. e., the consent of the county and Railroad Commissioners must be obtained.

This road, while it occupies and crosses no townway or highway, runs through a public thoroughfare called Main street, and crosses others, among them an important one called Onset avenue. These have been laid out by the association for public travel by foot passengers and teams, and during the season they are as much traveled as any public way in the town.

Although these ways are designated as streets and avenues, there is no claim that they are townways, streets or highways, or that the town is liable to keep them in order, or to respond in damages for any accident happening by reason of their being defective. One of them at least has a warning board stating this fact.

But the law is not confined to legally laid-out ways. It includes all "traveled places," meaning, as we suppose, all places habitually traveled by the public. The Supreme Court, construing these words in another provision of law, held that they applied to a traveled crossing never laid out, accepted or acknowledged by the town, and guarded by a signboard warning the public not to use it, as it was private and dangerous. And a railroad company was held liable because it had not placed a signboard at this crossing. (Whitaker vs. Boston & Maine Railroad, 7 Gray, 98.)

The words "traveled place," used in chapter 223 of 1849, under which this was decided, are repeated in section 165 of chapter 112, where they are clearly used in distinction from, and extension of, the words "highway" and "townway" in section 164. The words are used again in section 166, referring to gates and flagmen. And this board has applied the words to such crossings as those in question, with the acquiescence of railroad managers.

Unless the words "traveled place" have a different meaning in different sections of the same chapter, and especially in section 165 and section 224, the question seems to be settled by the court. This railroad does occupy and does cross a traveled place; it does so without the consent of the selectmen, and its construction as a freight railroad was therefore illegal, while its unauthorized operation with steam power is another illegality.

The reason for the various provisions extending safeguards to "traveled places" as well as to public ways are too plain to need statement. The sole object is security from danger. And the danger depends not on the origin of the way, or upon the technical question (often an intricate one) of its legal condition, but upon the fact that it is habitually traveled. At all events, it is the law; and this is decisive of the question presented to us as to this freight and passenger railroad.

It has been suggested that a passenger road might be constructed and operated upon the land of the owners without complying with any legal provisions as to railroads. Of course a final decision can only be made by the courts. But the statute seems to point strongly to a decision. The question is not whether a man may place ties and rails on his own land, but whether he can operate such a railroad as a common carrier, taking passengers for hire. It would seem that chapter 112 was intended to cover all such cases, and to place all such enterprises under state control for the sake of securing to the public safety, reasonable accommodation and other rights. The definition in section 1 makes the phrase "railroads and railways" in chapters 112 and 113 include "all railroads and railways in this commonwealth, except tramways in mines and marine railways." The exception strengthens the rule by referring to structures far removed from the ordinary understanding of the words. And again, by section 14, the board has "general supervision of all railroads and railways," and the provisions of the following six sections apply to all, and to the corporations, trustees or others owning or operating them.

Again, the express provision authorizing freight roads for private use seems to imply that passenger roads for public use cannot be constructed except under the general provisions of the law. The expression as to one class, a class less in need of state supervision, would appear to be an exclusion of the other class. At all events, we cannot advise the association or the lessee that illegality would be avoided by using their tracks exclusively for a passenger railroad, unless they comply with the provisions of the general railroad law.

It has been suggested that the track might be operated as a street railway. The board find nothing in the law to prevent this. The law does not provide that such railways shall always be constructed in streets. The statute definition of "street railways" makes no reference to their location in streets. In fact, one such railway exists in this state, running on private property the whole length of a beach, without regard to streets. The location is given to the selectmen, and they decide on the motive power to be used. The primary cause of giving them this power may be the fact that such tracks are usually laid in streets. But it is given them in all cases, and this local tribunal seems to be the fitting one for guarding interests that are in great part local.

It was supposed by some of the respondents that the charter giving the association the power to build, lease and sell under such rules as it may prescribe, gave to it the power of the selectmen in this regard. But this theory is untenable. The power to make rules is in its terms a restricted one. It does not set aside the general laws of the state. It would not, for instance, justify the directors in licensing the sale of liquor on their land. Just as little does it justify them in locating a street railway—a power given exclusively to the selectmen. But it is unnecessary to consider this question further. For no street railway corporation has been organized for the operation of such a railway.

The board regrets the difficulty into which innocent parties have fallen, and would be glad to see a way by which they might escape loss and delay. But our attention has been formally called to the matter by the selectmen, who, though no legal liability rests upon them or the town, feel a moral responsibility as "fathers of the town" that the public shall have all the safeguards required by law. And we are compelled to give notice to the association and to its lessee that the construction of the road was illegal and that its operation without due proceedings under the statute would be a further violation of law.

The Beland Track Drill Patent.

The case of Underwood against Warren and others, in the United States Circuit Court for the Eastern District of Mis-

souri, was a suit brought by F. J. Underwood, owner of what is known as the Underwood patent drill, against Andrew Warren and Perrin G. March, manufacturers of the Beland track drill, under the Beland patent. After stating the facts in the case, Judge Treat proceeded in his opinion, as stenographically reported, as follows:

"There is no element in the Underwood patent which is not in the Beland patent, except that in the Underwood combination there is a single bar instead of two parallel bars, with an addition which makes a separate claim, of what is called a bail whereby the single bar can be raised or lowered so that you may bore horizontally.

"That is sufficient for a general description. It so happens that the proprietors of the Beland patent have everything that they had before, only they have chosen, in order to hold the sliding block in position more firmly than had been done under the original Beland patent, to bore vertically through it and by means of a screw and a thumb-piece to hold it firmly in position.

"Now it is a most familiar principle in the law of patents that one who has a combination cannot sue as for an infringement any person who does not use his entire combination. If he has chosen to insert in his combination elements that are unnecessary, his patent meets with very little favor. In this particular case, however, there is no infringement on his combination at all. The averment seems to be that by using a vertical screw with a thumb-piece, which is the most familiar mechanical element to hold the slide in position, the defendants have infringed this complainant's combination. They have not used the combination nor any new element of it. * * *

"The bill is dismissed. There is no infringement."

OLD AND NEW ROADS.

Almaden & Saratoga.—This company has been organized to build a railroad from Almaden, Cal., through Saratoga to a point on the tidewater near Mountain View, a distance of about 18 miles.

Americus, Preston & Lumpkin.—The grading of this road is now completed to Lumpkin, Ga., which is to be the terminus. Some 10 miles from the starting point at Americus are already completed and tracklaying is now in progress.

Atchison, Topeka & Santa Fe.—The extension of this company's Southern Kansas line is now completed to Hazleton, Kan., 7 miles beyond Chrisfield, the last point noted, and 330 miles from Kansas City. Hazleton is to be the terminus of the road for the present.

Augusta, Gibson & Sandersville.—Work on this road is now progressing steadily and the grading is very nearly completed to Gibson, Ga., 50 miles south by west from Augusta. The track is laid for 30 miles from Augusta and regular trains are run to the terminus.

Baltimore & Ohio.—The Board of Port Wardens has approved the location and plan of this company's bridge over the Schuylkill River and ordered the necessary license to be issued. This removes the last legal obstacle to the construction of the line into Philadelphia.

Notice has been given that proposals will be received at the Engineer's office, No. 257 South Fourth street, Philadelphia, until Aug. 1, for grading, masonry, tunneling and construction of bulkheads on the main line and Delaware Branch of this road in Philadelphia and on the Schuylkill River East Side road. Proposals will also be received for the masonry of the Schuylkill River bridge. All plans and specifications may be seen at the Engineer's office. Proposals for tunnels must include lining the arches with 3 in. of coal tar and asphalt.

Baltimore & Potomac.—This company makes the following statement for June and the half-year to June 30:

	June, 1885.	June, 1884.	Six months, 1885.	Six months, 1884.
Earnings.....	\$103,957	\$101,965	\$655,542	\$577,961
Expenses.....	68,577	72,747	404,371	407,342
Net earnings.....	\$35,380	\$29,218	\$251,171	\$170,519

For the six months the gross earnings increased \$77,681, or 13.3 per cent., and the expenses decreased \$2,971, or 0.7 per cent.; the result being a gain of \$80,652, or 47.2 per cent. in net earnings.

Batesville & Brinkley.—On the extension of this road from the present terminus at Tupelo, Ark., to Newport, the crossing of the Iron Mountain road, about half the grading is completed, and the work is being pushed forward as fast as possible. The distance is about 15 miles. The road runs through a hardwood lumber district, with much good land.

Beech Creek, Clearfield & Southwestern.—On behalf of Mr. Vanderbilt, Gen. George J. Magee has sent out to the stockholders of this company an official circular setting forth the agreement entered into between the Pennsylvania and Vanderbilt, and urging them to accept it. The circular says:

"The Pennsylvania Railroad offers to purchase 60 per cent. of the stock of the Beech Creek, for which it will guarantee 2 per cent. semi-annually, on bonds representing the cost of construction of the road, incidental expenses, taxes and legal charges, the whole amount not to exceed \$5,000,000. The Pennsylvania further agrees to make a traffic contract for the movement of the coal and other freight of the Clearfield Bituminous Coal Co., which is a corporation composed of the parties who built the Beech Creek road."

General Magee further explains that, while the whole cost of the Beech Creek road was \$5,000,000, the sum of \$1,300,000 was borrowed by the company and is due and payable on Dec. 31, 1885. A sufficient amount to pay this sum must therefore be deducted. The Beech Creek stockholders will get, according to General Magee, 70 per cent. in bonds, 40 per cent. in Beech Creek stock and 40 per cent. in Clearfield Bituminous Coal stock (already distributed), making \$1,440 for each person who originally invested \$1,000 in the Beech Creek enterprise. The Pennsylvania Railroad Company are not to issue any bonds or stock to Mr. Vanderbilt, but will simply guarantee the payment of a certain sum a year, and will receive in return the control of the South Pennsylvania and Beech Creek lines.

A meeting of stockholders of this company was held in Philadelphia, July 28, at which about \$1,000,000 of the stock was represented. The proposed transfer of the road to the Pennsylvania was discussed and a majority of those present decided not to accept the terms offered, and a committee was appointed to see what could be done. It is not thought, however, that this opposition can prevent the transfer.

Buffalo, New York & Philadelphia.—A suit in foreclosure of the mortgage has been begun in the United States Circuit Court in Erie, Pa., by Henry Martin and Franklin B. Locke, trustees. This suit is not a new proceeding, but is auxiliary to the suits already begun in the New York Supreme Court.

Canadian Pacific.—A London dispatch says that applications for the \$15,000,000 first-mortgage bonds offered in that city have exceeded the amount to be sold.

Central, of New Jersey.—No change has taken place in the situation of this road, although a report has been in circulation that an arrangement had been made with the Baltimore & Ohio Company to advance the money required to pay overdue interest. This report, however, is not substantiated and it does not appear to be very probable, as the Baltimore & Ohio Co. would certainly not advance any considerable sum unless some definite arrangement for the control of the Central had been concluded, and that is hardly possible under present circumstances.

Chesapeake & Ohio.—The United States Circuit Court has temporarily enjoined the collection of the taxes claimed from this company by the state of West Virginia.

Chicago, Burlington & Quincy.—Contracts have been let for the construction of a new branch, which is to extend from Holdrege, Neb., on the Kennesaw cut-off, westward 40 miles to Elwood. This branch extends into an entirely new country, and will probably be further extended as settlement increases in that direction.

At a meeting of the directors in Boston, July 24, a plan was submitted for securing the construction of a new line up the east side of the Mississippi River to St. Paul in connection with this road. The plan, it is stated, raised considerable discussion, and was finally referred to a committee for consideration, and the board will not take final action until this committee has reported. The details have not been made public, but it is understood that a company is to be organized, to be called the Chicago, Burlington & Northern, which is to build the road. The company, it is said, is to issue \$7,000,000 in stock and an equal amount in bonds, and these securities are to be offered to Chicago, Burlington & Quincy stockholders, the bonds at 90 and the stock at 35. The new road will be operated by the Burlington Co., which will guarantee the minimum amount of earnings and a sinking fund for the redemption of the bonds. Whether the new company will be an entirely new organization, or whether one of the two or three companies which have already projected a similar line will be absorbed, is not stated and apparently not yet decided, nor has the Burlington Co. as yet taken final action on the proposition.

Chicago & Northwestern.—This company proposes to issue on Aug. 1 an additional amount of its consolidated sinking fund bonds of the issue already listed on the Exchange, for the purpose of substituting them for other classes of bonds of this company which fall due Aug. 1. All consolidated sinking fund bonds issued and to be issued are coupon bonds of \$1,000. The bonds are secured by mortgage lien on 775.74 miles of railroad, with equipment, in the states of Illinois, Wisconsin and Michigan. Issue is at the rate of \$16,629 per mile, and by consolidation and retirement of underlying bonds will become a first mortgage on these roads and their terminals in Chicago and elsewhere. Application was made to list \$4,407,000 to be issued Aug. 1, and for the small balance of \$244,000 to be issued thereafter. The Committee on stock list has, under authority given by the Governing Committee, directed that these \$4,651,000 of bonds be added on Aug. 1 to those now on the list, making the total amount of consolidated 7s of 1915 on the list at that date \$12,900,000—being Nos. 1 to 15,131, the entire authorized issue, excepting \$2,231,000 heretofore retired and canceled, and the committee further directs that the Chicago & Northwestern sinking fund 7s of 1885, the extension bonds 7s of 1885 and the first mortgage 7s of 1885, maturing Aug. 1 be dropped from the list.

Cincinnati, New Orleans & Texas Pacific.—This company has bought a large tract of land in Birmingham, Ala., and will at once begin to build there repair shops for the Alabama Great Southern Division. The shops, it is stated, will be of large size and fully equipped.

Cincinnati Northern.—The bondholders who recently bought this road at foreclosure sale have organized the Cincinnati, Lebanon & Northern Co. The new company will issue stock to represent the old bonds.

Delaware, Maryland & Virginia.—The sale of the controlling interest of this road to the Pennsylvania Railroad Co. has been completed, and on July 25 the road was turned over to the Philadelphia, Wilmington & Baltimore Co., under whose organization the road will hereafter be operated. It will be made part of the Delaware Division of that road.

Denver & Rio Grande.—Messrs. Wm. B. Bonn, S. Neustadt and Carl Schurz, representatives in New York of the Amsterdam and Frankfort committees, have addressed the following circular to the first-mortgage bondholders:

"Soon after the default in November last by the Denver & Rio Grande Railroad Co., in the payment of its interest upon its first mortgage bonds, committees to represent the first mortgage bondholders were appointed in Frankfort and Amsterdam, and by those committees the undersigned were appointed a committee for the same purpose in New York.

"Messrs. Evans, Choate & Beaman were selected as the counsel for the committee, and various steps have been taken for the protection of the bondholders.

"On May 23 last the sole surviving trustee, L. H. Mayer, Esq., acting under the authority given him in the mortgage in case of default of interest and at the request of a large number of bondholders, declared the principal of the bonds to be due and payable. A bill of foreclosure was also prepared, but the filing thereof has been delayed.

"The Receiver, under the order of the Court, announces that he proposes to pay on Aug. 1 the interest due Nov. 1 last. We think it for the interest of the first-mortgage bondholders that they confer with us or our counsel before they surrender their November coupons."

Denver & Rio Grande Western.—The Boston Transcript says: "The stock and bonds of the Denver & Rio Grande Western are being looked up by some Boston parties, and a few facts may be of interest. The road runs 368 miles from the Colorado State line, through Utah to Salt Lake City, and thence to Ogden. It is the Utah and California connection for the Denver & Rio Grande and for some overland traffic in connection with the Atchison, Topeka & Santa Fe and the Chicago, Burlington & Quincy. Its only bonded debt is \$19,000 per mile, or \$6,900,000. Three coupons will have accrued Sept. 1, 1885, and, with these overdue coupons on, the bonds are selling at 43½ in New York. There are no other bonded or floating debts and no receivers' certificates. The stock amounts to \$7,500,000, and is quoted at 7½. Mr. W. H. Bancroft was appointed Receiver by the United States Court July 12, 1884, and for the year succeeding the gross earnings amounted to \$950,000, and the Receiver looks for earnings the coming year of \$1,200,000 gross. The net earnings of the past year, some \$300,000, have been spent in betterments and improvements, including 50 new span bridges and an iron bridge across Green River. Mr. Bancroft writes that the physical condition of the property is much better than ever before, and that all extraordinary expenses are ended. The stockholders hope to take possession of their property at no distant day."

The suit of this company against the Denver & Rio Grande,

to establish the validity of the lease of its road to that company and recover damages for the abrogation of the lease, has been decided in favor of the Denver & Rio Grande Western Co. It is understood, however, that an appeal from this decision will be taken.

Dubuque & Northwestern.—The contractors on this road, D. C. Shepard & Co., of St. Paul, have let a number of sub-contracts, and grading has been begun on the section of 8 miles from Dubuque, Ia., to Durango. This road is intended to connect at the Minnesota line with the Minnesota & Northwestern.

Eutawville.—Work is progressing on this road and some 10 miles of grading are reported finished, while contracts have been let for several long trestles, and rails for 12 miles have been ordered. The road is to run from the South Carolina Railroad, 41 miles from Charleston, north to Eutawville, a distance of about 21 miles.

Florida Southern.—The grading of the extension of this road from Pemberton Ferry, Fla., southward to Lakeland on the South Florida road is now completed, and track-laying is in progress. The rails are down for about 15 miles, and are expected to reach Lakeland by the end of August, the distance to that point being 35 miles from Pemberton Ferry. The extension from Lakeland southward 80 miles to Charlotte Harbor has been finally located as far as Fort Meade, and the surveys are in progress from that point to Charlotte Harbor. A large force has been put at work on the grading from Lakeland to Fort Meade and the work is to be pushed as fast as possible. There is no difficult grading to be done, the country being generally flat, but a good many small bridges will be required.

Gulf, Colorado & Santa Fe.—Work is progressing well on the extension of this road to Brownwood, Tex. The engineers are now surveying a further extension from Brownwood northwest, and have run a line which crosses the Texas & Pacific near Lebo. Another line, it is said, is to be run, crossing the Texas & Pacific east of that point and continuing north, by Anson, to the Salt Fork of the Brazos River.

Illinois Central.—This company has bought three steamboats, to run on the Yazoo, Tallahatchie and Sunflower rivers in connection with its Yazoo City Branch. The steamboats have been bought with a special view to their use in the cotton carrying trade, and will also carry passengers. It is expected that they will be put in service during August.

Intercolonial.—An order recently issued by the General Superintendent provides that in case of trains following others no train shall be allowed to leave any station until the preceding train is reported as having passed the next station, thus establishing a sort of block system. The adoption of this order is probably due to the occurrence of one or two rear collisions on the line. The stations on the northern division of this road are long distances apart.

Jonesboro.—A preliminary organization has been completed for the purpose of building a branch road from Jonesboro, Ga., to connect with the East Tennessee, Virginia & Georgia at Stockbridge. The road will be about 7 miles long.

Kansas City, Clinton & Springfield.—Regular trains have begun to run over this road between Kansas City and Clinton, Mo., 94 miles. Work on the construction of the road continues actively and track is laid to Deepwater, 8 miles south of Clinton.

Kansas & Gulf Short Line.—Track on this road is now laid to a point 5 miles south of Wells, Tex., and 77 miles from Tyler, leaving 13 miles to be completed to reach the connection with the Houston, East & West Texas. A considerable force of convicts is employed, and the company hopes to have the road completed by October 1.

Los Angeles & San Gabriel Valley.—This road is now graded from Los Angeles, Cal., northeast 13 miles, and track-laying has been begun. The road is intended to run through Pasadena to the head of the Azusa Valley, a distance of about 30 miles.

Mexican Railroad Notes.—The following notes are from the Mexican Financier of July 18:

From Yucatan comes the news that the working force on the railroad from Mérida to Peten has been reduced, and a new survey begun on a route which from Huncabchen goes directly to Tekax, passing through the towns of Chabap, Mani and Oxhutzcab. A branch road is to be built to Ticul on the completion of the main line.

The press at Tampico exhibits a great deal of anxiety regarding the completion of the Central's branch road from that port to San Luis Potosí, and a doleful story is told of the present condition of the would-be rival to Vera Cruz. A connection with San Luis Potosí would, no doubt, tend to the building up of Tampico, and the lands along the road, being very fertile, are well adapted for an extensive colonization which would add to the wealth of the region. Already 166 kilometers of the road have been built and there construction has stopped with no prospect of a speedy resumption of work. Still, we can have but little sympathy with the citizens of Tampico, who, while declaring that they will be ruined if the railroad is not built, do not lift a hand to aid the company, and have not put a dollar into the enterprise. It will be many years before Tampico begins to be a rival of Vera Cruz, if the inhabitants of the former city do not display more public spirit. *El Faro* of Tampico has a sensible word to say on this point, remarking: "The commercial community, the owners of the haciendas bordering on the railroad and the towns on the line ought to join together to aid the company in an efficacious manner, if the company will not declare publicly and formally that it has the means necessary for a prompt pushing of the work needful to bring the line to a speedy termination."

Midland, of Indiana.—This company recently laid track from its junction with the Cleveland, Columbus, Cincinnati & Indianapolis at Anderson, Ind., to the Chicago, St. Louis & Pittsburgh track, about one-fourth mile distant. The Cleveland Co. claims that this track is laid upon its right of way and has commenced proceedings to compel the Midland Co. to remove it.

Milwaukee, Lake Shore & Western.—It is said that this company is making arrangements to build a branch about 60 miles long, from Watersmeet, Mich., to a point where the main line turns westward toward Ashland, east by north to a junction with the Detroit, Mackinac & Marquette road. In connection with the company's line to Ashland and with the existing lines to the eastward, this branch would make a through line from the eastern terminus of the Northern Pacific eastward to the Straits of Mackinac, and to a connection with the roads there. It is also reported that the company will assist the Detroit, Mackinac & Marquette in building its proposed branch to the Sault Ste. Marie to connect with the Canadian Pacific.

New York Central and the Pennsylvania.—The agreement between these companies has gone so far that the terms on which the Central is to acquire the West Shore

and the Pennsylvania the Beech Creek and the South Pennsylvania lines have been made public, as noted elsewhere, and everything indicates that the transfers will be made in due season. That of the West Shore will, of course, take some time, on account of the legal formalities to be gone through, even if the bondholders should generally agree to it.

Some opposition to the Beech Creek and the South Pennsylvania transfers has been manifested, which may delay them, but can hardly prevent their completion. Among other points raised by the opposition is a protest made by the Western Maryland Co., which had made a contract for a connection with the South Pennsylvania, and fears that it may be seriously damaged if that road is not built.

The latest reports are that the Baltimore & Ohio will try to form a combination to protect itself against the new alliance, but what direction its action will take is not indicated, and the whole thing rests upon mere rumor.

New York, West Shore & Buffalo.—Some trouble is reported with the employees of this road on account of the failure to pay wages in time. It is stated that wages for May have been only partially paid, and that nothing has been paid for June. The employees of the repair shops at Frankfort have ceased work, and say that they will not return until they have received the full amount due them up to the close of June.

The arrangement for the transfer of the road to the New York Central is set forth as below in a circular issued by Drexel, Morgan & Co., of New York, on July 28:

"Being convinced that the interests of the New York Central & Hudson River Railroad Co., and of the bondholders of the New York, West Shore & Buffalo Railway Co. would be best promoted by the former company securing a lease of the railroad of the latter company, and working such railroad in harmony with its own system, we opened negotiations to secure this result.

"These negotiations have reached a point at which we are prepared to lay the following proposal before the bondholders of the West Shore Co., in order that each one of them who may now so elect shall have equal opportunity to share with us the benefit of our contract hereinafter mentioned, and with the view also of promoting unanimity and a speedy termination of pending difficulties.

"The New York Central & Hudson River Railroad Co. has executed a contract with us, agreeing, upon a reorganization of the New York, West Shore & Buffalo Railway Co., to take possession of the property of the reorganized company, under a lease, and to guarantee the principal and interest of the bonds hereinafter mentioned, which are to be secured by mortgage upon that property.

"The conditions of the contract are as follows:

"First—That the securities to be issued by the reorganized company shall be limited to \$50,000,000 4 per cent. mortgage bonds, and \$10,000,000 capital stock, the bonds to be dated Jan. 1, 1886, and to mature at the expiration of the lease, say in 475 years, or upon default in payment of interest for two consecutive years.

"Second—That of the mortgage bonds \$25,000,000 shall be offered in exchange for the \$50,000,000 first-mortgage bonds of the present company, with past due coupons attached—that is to say, \$1,000 of the new guaranteed bonds for \$2,000 of the old.

"Third—That the remaining \$25,000,000, except such amount as may be necessary for reorganization, shall not be issued except at the request of the New York Central & Hudson River Railroad Co., to provide for prior liens, necessary terminals and such other property and for such other purposes as the directors of the New York Central & Hudson River Railroad Co. may from time to time think necessary for the security, development and operation of the property leased.

"Fourth—That the capital stock of the reorganized company shall be surrendered to the New York Central & Hudson River Railroad Co., as a consideration for its lease and guarantee.

"Fifth—That the leased property shall be delivered prior to Jan. 1, 1886.

"We therefore offer to the first-mortgage bondholders of the West Shore Co. the opportunity to avail themselves of our agreement with the New York Central & Hudson River Railroad Co., upon the following conditions:

"First—That their bonds shall be deposited with us, with the agreement hereto attached duly executed by the depositors.

"Second—That at least a majority of the whole issue shall be deposited.

"Pending the deposit of such majority, temporary receipts will be given for the bonds. After a majority shall have been secured, temporary receipts will be exchanged for engraved receipts, negotiable in form, countersigned by the Union Trust Co., in whose custody the bonds will remain until required by us for purposes of reorganization.

"In case a majority shall not be secured, and a reorganization perfected within the time required under the contract with the New York Central & Hudson River Railroad Co., the bonds will be returned free of expense, upon surrender of the receipts duly assigned.

"It is right that we should add that a very large proportion of the bonds required have already assented to the proposed plan. Upon receiving the assent of a majority in amount of the present West Shore bonds, immediate steps will be taken which, we are advised, will secure prompt reorganization and prevent further depreciation and waste of property.

"The right is reserved to terminate at any time the privilege of accepting the offer hereby made."

The current report is that the negotiations conducted by Drexel, Morgan & Co. have so far progressed that a basis of agreement with the North River Construction Co. and the owners of the terminal property has been reached, and also that about two-thirds of the floating debt claims have been bought up, most of them at about 50 cents on the dollar. With the receivers' certificates it is estimated that all claims outside of the first-mortgage bonds can be settled for an amount which will be represented by about \$15,000,000 of the proposed new bonds, which, with the \$25,000,000 promised to the present bondholders, will make about \$40,000,000 in all, leaving \$10,000,000 unissued. It appears probable that the control of a considerable amount of the bonds was already with Drexel, Morgan & Co., or promised to them before they made their proposition public, and the present indications are that considerably more than a majority of the bonds will accept the settlement.

Norfolk & Western.—This company's statement for June and the six months to June 30 is as follows:

	1885.	1884.	Six months.—	1885.	1884.
Gross earnings.....	\$191,767	\$183,869	\$1,237,030	\$1,246,502	
Expenses	134,713	126,615	791,337	787,753	
Net earnings.....	\$57,054	\$57,254	\$445,693	\$458,749	
Per cent. of exp.....	70	69	64	63	

The decrease in gross earnings for the six months was 0.8 per cent.; in net earnings, 3 per cent.

The statement is accompanied by a table showing the freight and passenger traffic and earnings for the six months. This shows a total of 8,111,538 passenger-miles, a decrease of 1 per cent., there being an increase of 47 per cent. in through and a decrease of 12 per cent. in local traffic. The

freight traffic amounted to 133,298,425 ton-miles, an increase of no less than 81 per cent., the decrease in through traffic being 4 per cent., and the increase in local ton-miles no less than 158 per cent.

The statement says: "The heavy increase in the number of tons of local freight carried, and in the tonnage-mileage of local freight, is entirely due to the coal shipments, as is shown by the following statement, in tons of 2,000 pounds:

	Coal.	Coke.	Total.
1884.....	53,159	24,371	77,530
1885.....	230,254	18,347	248,601

Increase or decrease.....I. 177,095 D. 0.024 I. 171,071

"The total mileage of passengers for the first six months of 1885 was about the same as in the same period of 1884, but the tonnage-mileage of freight increased 81 per cent. The total miles run by all revenue trains was also greater (16 per cent.). Notwithstanding this increase of traffic, the operating expenses (including taxes) increased very slightly, being but one-half of 1 per cent. greater in 1885. The average per train-mile for expenses and taxes in 1884 was 71 cents, and in 1885 62 cents, showing a decrease of 9 cents per mile, or 13 per cent., in the average cost of operating the road.

"From the foregoing table it is evident that there was a considerable increase in the average distance traveled by passengers, but a decrease of the average rate per mile received from passengers. The average haul of freight was also largely increased and the revenue per ton per mile largely decreased, owing to the cheaper character of the freight carried and to the low rates prevailing."

Northeastern, of Georgia.—This company recently made application to the city council at Athens, Ga., to be released from its obligations incurred when that city voted aid to the road to extend the line to Clayton on condition that the company shall build a branch to the Georgia Railroad at Madison or Social Circle. This proposition caused considerable local excitement, and some of the parties interested obtained a temporary injunction to restrain the city council from acting upon the proposition. The case will be tried shortly.

Northern Central.—This company's statement for June and the half-year to June 30 is as follows:

	June.	1884.	1885.	1884.
Earnings.....	\$416,219	\$416,635	\$2,597,772	\$2,620,255
Expenses.....	280,239	280,006	1,554,597	1,671,912
Net earnings....	\$135,980	\$136,629	\$1,043,175	\$948,343

For the six months this shows a decrease in gross earnings of \$22,483, or 0.9 per cent., and a decrease in expenses of \$117,315, or 7.0 per cent.; the result being a gain of \$94,832, or 10.0 per cent., in net earnings.

Northern Pacific.—The directors of this company on July 23 approved the joint lease of the Oregon Railway & Navigation Co.'s property (terms stated heretofore). The President was directed to execute the lease jointly with the officers of the Union Pacific and the Oregon Short Line companies. It is to date from July 1, 1885, and will be presented to the stockholders for ratification at the annual meeting in September.

Onset Bay.—Track has been laid on this road from Onset Bay Station, Mass., to the Onset Bay camping grounds in the town of Wareham, a distance of about 1½ miles. The road was built by the Onset Bay Grove Association, and runs almost entirely through the lands belonging to that association; but just as everything was ready for the opening of the road the point was raised that it had no legal existence, as it does not appear that the association has any authority to build a railroad, and no separate organization was made under the railroad law for that purpose. Moreover, no permission to acquire the right of way has been obtained either from the selectmen of the town or the county commissioners, the directors of the association having apparently supposed that they could build the road without permission from any one as long as it passed over their own grounds and no one presented any objections. The case has been submitted to the Railroad Commissioners, who have given a hearing, and, after taking the matter under consideration, decided that the road cannot legally be operated for passenger traffic. A company will have to be organized in regular form, according to law, to work the road.

Oregon Railway & Navigation Co.—It is said that a strong opposition to the proposed lease of this company's line to the Union Pacific and Northern Pacific companies is growing up among the stockholders, many of whom believe that the company can earn a higher rate of dividends than that provided by the lease. Some of the dissatisfied stockholders are trying to organize an opposition, but it is not thought probable that they will be able to vote it down or to overcome the weight of the large block of stock held by the Oregon & Transcontinental Co., which will be voted in favor of the lease.

Pennsylvania.—This company's statement for June shows for all lines east of Pittsburgh and Erie, as compared with June, 1884, a decrease in gross earnings of \$170,536; an increase in expenses of \$3,046, and a resulting decrease in net earnings of \$173,582. For the six months to June 30, as compared with the corresponding period of 1884, the same lines show a decrease in gross earnings of \$2,013,656; a decrease in expenses of \$421,274, and a decrease in net earnings of \$1,592,382.

Carrying out these changes, we have the following figures:

	June.	1884.	1885.	1884.
Earnings.....	\$3,735,639	\$3,906,175	\$21,319,600	\$23,333,256
Expenses.....	2,826,202	2,823,156	14,799,942	15,221,216
Net earnings....	\$909,437	\$1,083,019	\$6,519,658	\$8,112,040
P. c. of expe..	75.6	72.3	69.4	65.2

For the six months the decrease in gross earnings was 8.6 per cent., in expenses 2.8 per cent., and in net earnings 19.6 per cent.

All lines west of Pittsburgh and Erie for the six months of 1885 show a deficiency in meeting all liabilities of \$886,008, being an increased deficiency, or loss, of \$121,153, as compared with the corresponding period of last year.

Philadelphia & Reading.—The extent to which this company will be affected by the new agreement between the New York Central and the Pennsylvania, is just now a subject of much discussion. Of course the abandonment of the South Pennsylvania, or its completion under Pennsylvania control, will deprive the Reading of the benefits which it might have derived from the exchange of traffic with that road. How great this benefit might have been is largely a matter of opinion; very possibly it might not have been equal to the loss caused by the building of the Pennsylvania line from Philadelphia to Reading and its continuation to the Schuylkill coal district, which is now in progress. In some quarters it is thought that the abandonment of the Reading by Mr. Vanderbilt opens the way to its acquisition by the Pennsylvania under the foreclosure of mortgages which now seems inevitable.

The Receiver's statements give the following figures for

the earnings of the railroad for June and the seven months of the fiscal year from Dec. 1 to June 30:

	June.	1884.	1885.	1884.
Earnings.....	\$2,428,209	\$2,148,783	\$15,025,765	\$16,516,306
Expenses.....	1,484,837	1,250,836	9,385,617	10,123,911

Net earnings \$943,456 \$897,927 \$5,640,148 \$6,392,395

For the seven months this shows a decrease in gross earnings of \$1,490,541, or 9.0 per cent., and a decrease in expenses of \$788,294, or 7.3 per cent., the result being a decrease in net earnings of \$752,247, or 11.8 per cent.

The traffic of the railroad lines was as follows:

	June.	1884.	1885.	1884.
Passengers.....	2,061,225	1,775,151	12,582,894	13,242,590
Tons merchandise..	733,660	686,420	4,423,181	5,113,739
Tons coal.....	1,034,133	780,834	6,197,513	5,926,215
Tons coal on colliers..	51,933	40,636	315,454	300,826

The traffic for June shows a gain, for the first time in a number of months. For the seven months there is still a decrease in all traffic except coal.

The statement for the Philadelphia & Reading Coal & Iron Co. is as follows:

	June.	1884.	1885.	1884.
Earnings.....	\$1,320,095	\$1,083,357	\$7,710,930	\$8,164,374
Expenses.....	1,399,686	1,110,842	7,918,577	8,613,936
Deficit.....	\$79,591	\$27,485	\$207,638	\$449,562

For the seven months the gross earnings decreased \$453,435, or 5.6 per cent., and the expenses \$695,359, or 8.1 per cent., the result being a decrease of the deficit by \$241,924, or 53.8 per cent.

The coal mined from the company's lands was:

	June.	1884.	1885.	1884.
By Coal & Iron Co..	410,862	289,922	2,482,736	2,246,312
By tenants.....	69,911	51,959	406,284	469,256
Total.....	480,773	341,881	2,889,020	2,655,568

The increase in tonnage for the month was large; for the year it was 233,452 tons, or 8.8 per cent.

The joint net earnings of the two companies were:

	June.	1884.	1885.	1884.
Railroad Co. net....	\$943,456	\$897,927	\$5,640,148	\$6,392,395
Coal & Iron Co. dft.	79,591	27,485	207,638	449,562
Total.....	\$863,865	\$870,442	\$5,432,510	\$5,942,833

Decrease for the month, \$6,577, or 0.8 per cent.; decrease for the seven months, \$510,323, or 8.6 per cent. As the expenses do not include any charges for interest or rentals, the net earnings are the amounts from which those charges must be met.

The new reorganization trustees met for the first time in Philadelphia, July 29, but did nothing except to discuss the situation and adjourn for two weeks.

The Receivers have decided that they will not pay any interest on New Jersey Central obligations, pending the proceedings by that company to recover possession of its road.

Pittsburgh & Western.—The decree filed last week in the United States Circuit Court gives the Receiver authority, in case he shall consider it for the best interest of the bondholders, to borrow money to pay off the floating debt and to apply all income from the road to the payment of its obligations. The claims for which certificates are to be issued and money borrowed include right of way claims, balances due on equipment bought, balances due other roads, and all the current indebtedness as existing at the commencement of the receivership. The certificates to be issued are to bear 6 per cent. interest, and are, by the order of the Court, to be a prior lien upon the property and payable as soon as possible from the earnings of the road. The total floating debt as reported by the Master, amounts to \$1,993,964.

Richmond & Allegheny.—The reorganization committee has fixed upon August 29 as the limit of time within which holders of stock and bonds may join in the reorganization plan. Holders are requested to deposit their securities with the Mercantile Trust Co. in New York on or before that date.

Rutland.—At the annual meeting in Rutland, Vt., July 23, the old directors were re-elected without opposition. Ex-Governor Page was, however, present, and made a speech bitterly attacking the course of the present management. He also gave notice that the legality of the election would be contested, on the ground of an informality in the notice for the meeting. A motion to discontinue the suit in relation to the over-issue of stock was voted down.

St. Paul, Minneapolis & Manitoba.—The following estimated statement for the year ending June 30 last is published:

Net earnings for the year.....	\$4,700,000
Fixed charges.....	2,600,000

Surplus for the year.....\$2,700,000

This surplus is equivalent to 13½ per cent. on the stock. The dividends paid have been 6 per cent., requiring \$1,200,000, and leaving \$1,500,000 balance.

Shenango & Allegheny.—Arguments on the motion for a decree of foreclosure and sale under the first mortgage were heard in the United States Circuit Court in Pittsburgh, July 29. The motion is opposed by holders of second-mortgage bonds and stock, who claim that if time is given all the obligations can be met.

South Pennsylvania.—The terms for the transfer of the Vanderbilt interest in the South Pennsylvania to the Pennsylvania Railroad Company have not been positively announced. It is believed, however, that the contract was practically concluded at the meeting held in New York, July 23. A meeting of the South Pennsylvania Railroad syndicate was held in New York July 24, and members unable to be present were asked to forward their proxies. It was supposed that the sale of the property to the Pennsylvania Railroad Co. would be consummated at the meeting, but all that was given out was that members of the syndicate met and discussed the matter of continuing construction of the road. No decision was reached, and the matter was left open for further discussion. The terms of sale are said to be \$10,000,000 for the South Pennsylvania and Beech Creek roads, the former in long bonds at 4 per cent., and the latter in long bonds at four per cent. In order to evade the provisions of the Pennsylvania state constitution preventing the purchase of parallel lines, it is thought that Drexel, Morgan & Co. will be the nominal purchasers.

Suffolk & Carolina.—This railroad was built some time ago by the Suffolk Lumber Co., from Suffolk, Va., southward to the Carolina line, about 15 miles. Recently work was begun on an extension of the road from the state line southward to Sunbury, N. C., 10 miles, and about 7 miles of track have been laid. Work is progressing steadily though somewhat slowly, and it is expected that trains will be running to Sunbury in about a month.

Texas & St. Louis.—The committee appointed by the bondholders at the recent meeting in New York held a meeting July 27, and after discussion, concluded that the ar-

rangement of a new plan of reorganization was not practicable.

Application has been made to the Court on behalf of the bondholders to postpone for 30 days the sale of the Texas Division, which was ordered to take place August 4. No action has yet been taken on this application.

Ulster & Delaware.—The New York Railroad Commission has rendered a decision on the petition of the town of Harpersfield asking that this company (formerly the Rondout & Oswego road) be compelled to complete its line from Stamford to Oneonta or to refund the money the town invested in the road. It says: "The town took stock to the amount of \$100,000 and paid for it, for the purpose of getting a road through the town. It not only has lost its stock, but it has for nearly 20 years in vain waited for the road. Nothing before the board has shown this failure on the part of the road to be other than the result of misfortune and financial inability. The management of the Ulster & Delaware Railroad Co. has openly acknowledged that strong obligations rest upon it to build and complete the road. The President in his testimony states that it is not only the intention of the corporation to build the road to its terminus, but that it has taken the preliminary steps and is putting itself in a position to go on with that extension. The board urges that it make every reasonable effort to do so as speedily as possible. No change in the location of the line can properly be made under section 23 of the general act, nor ought it to be permitted."

Union Pacific.—The earnings of this company's Oregon Short Line for May and the five months to May 31 were:

	May.	1884.	1885.	1884.
Gross earnings.....	\$148,321	\$63,671	\$603,804	\$600,693
Operating expenses..	102,064	64,083	454,885	353,334
Net earnings.....	\$46,257	Def. \$412	\$148,919	Def. \$53,241

This shows for the five months an increase in net earnings of \$303,711, or 101.2 per cent., and an increase in expenses of \$101,551, or 28.7 per cent., the result being a net gain of \$202,160.

Vicksburg, Shreveport & Pacific.—The work of raising the track of this road above high water or freshet level has been completed from Monroe, La., eastward to Rayville, a distance of 21 miles, and the contractor is now at work on the second section from Rayville to Delhi, 16 miles. This section will probably be completed about October, when work will be begun on the third section, from Delhi to Tallulah, 18 miles, with the intention of finishing that section this year. From Tallulah east to Delta the road is already at the desired level, with the exception of one or two points, where very little work will be required.

Wisconsin Central.—A Milwaukee special gives the following statement by President Colby and Trustee Abbott of the Wisconsin Central Railroad, in relation to its acquisition of terminal facilities in Chicago and the way in which it will probably be enabled to reach them if the Chicago, Milwaukee & St. Paul still refuses the use of its tracks:

"Finding that the St. Paul Co. was not able to furnish us terminal accommodations in Chicago, we withdrew our request for terminals, and said we would take care of ourselves in that respect. After negotiating in several directions and carefully considering several plans, we became so deeply impressed with the value of the Chicago & Great Western Railroad Co.'s charter and location, that as soon as that company had perfected its arrangements last May for entrance into Chicago we decided to avail ourselves of the facilities which that company possesses. That company has an entrance into Chicago from the West and also another from the South, and a location, under an old charter, into the heart of the city east of the South Chicago River to Harrison street. Its passenger station will be close to the Lake Shore & Michigan Southern station, and will be within a block of the new Board of Trade. Passengers for the city of St. Paul by either the St. Paul or the Northwestern road are obliged to travel a long distance through the streets in omnibuses and across bridges to reach the stations respectively of those companies. Passengers by the new line for St. Paul can start from the heart of the city, within two minutes' walk of the Board of Trade, Grand Pacific Hotel, court house, custom house, etc. The Chicago & Great Western yard will have more than a quarter of mile of river front, and is very near all the starting points of the principal lines going East. Of course the new St. Paul line, when it reaches Chicago, will have nothing to do with the Chicago & Great Western Railroad Co., except to be one of its tenants, but the last-named concern will be able to furnish most desirable terminals near to the centre of business of Chicago for any railroad approaching that city from the Northwest, West or South. It will be for the present the terminal of the company, although it has a charter to build to the Mississippi River. The control of that company is in the hands of friends of the new St. Paul line, and if the Northern Pacific desires hereafter to pour its business into Chicago, ample provisions can easily be made for its accommodation on the Chicago & Great Western grounds. In June last Charles L. Colby was chosen President and Edwin H. Abbott Vice-President of the Chicago & Great Western. When the work is finished on the plans proposed, it is believed that these terminals will not be surpassed in convenience and value by those of any company now located in Chicago. Ample funds have already been provided to do this work.

"How the business of the Wisconsin associated lines will reach these terminals is not yet determined. Negotiations have been pending for several months with the St. Paul Co. to furnish to the trustees of the Central Railroad a track to Chicago for the transmission of any business the trustees may choose to throw upon it from whatever source they get it. Nothing has as yet been finally settled between the St. Paul Co. and the trustees. If an agreement is not reached soon, the trustees will probably be obliged to abandon their effort to extend the Wisconsin Central control beyond its present limits. In this event these associate corporations, the Wisconsin & Minnesota and the Minnesota, St. Croix & Wisconsin roads, which own the track between Abbottsford and St. Paul, will doubtless provide some way of reaching the Chicago & Great Western terminals in Chicago without the co-operation of the St. Paul Co. This can easily be done by leasing or getting trackage facilities over the Wisconsin Central Railroad from Abbottsford to Schleisingerville, and then building their own line from Schleisingerville to Chicago. Whether this will be done, or any other like method adopted, remains to be seen. The Wisconsin Central trustees have tried very hard to maintain the same close relations with the St. Paul Co. which have existed for 12 years past, and to establish a Wisconsin Central line under the control of the Wisconsin Central Co. to Chicago. They hope that the St. Paul Co. may see it to be for their interest to co-operate with the trustees in carrying out this original design, but the two corporations which lie west between Abbottsford & St. Paul are largely owned by parties not interested in the Wisconsin Central Railroad. These parties are not disposed to let their traffic be blocked, as at present, and cut off from reaching Milwaukee and Chicago. They are abundantly able to protect themselves, and build any line of railroad in the state which they think it for their interest to build. It is proper to say, however, that none of them are interested in the alleged new Illinois corporation

styled the Wisconsin Central Railroad Co., and they know nothing about it, notwithstanding newspaper reports to the contrary."

ANNUAL REPORTS.

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Mobile & Girard.

This company owns a line from Columbus, Ga., to Troy, Ala., 84 miles, and its report is for the year ending May 31. It is controlled by the Central Railroad Co., of Georgia.

The equipment consists of 7 locomotives; 7 passenger and 5 baggage and mail cars; 36 box, 44 flat, 21 coal and 3 caboose cars.

The company has \$987,600 common stock, \$279,800 preferred stock and \$1,080,000 bonds.

The earnings for the year were:

	1884-85.	1883-84.	Inc. or Dec.	P. c.
Freight.....	\$172,518	\$184,035	D. \$11,517	6.3
Passage.....	46,810	53,546	D. 6,736	12.5
Mails.....	4,969	4,089	I. 880	21.4
Total.....	\$224,297	\$241,670	D. \$17,373	7.7
Expenses.....	177,736	191,988	D. 14,252	7.4
Net earnings.....	\$46,561	\$49,682	D. \$3,121	6.2
Gross earn. per mile.....	2,670	2,877	D. 207	7.2
Net.....	554	591	D. 37	6.2
Per cent. of exps.....	79.2	79.4	D. 0.2	

The interest charge on the bonded debt being \$54,020 yearly, the net earnings show a deficit of \$7,459 for the year.

Atlanta & West Point.

This company operates a line 87 miles long, from Atlanta, Ga., to West Point. Of this it owns 81 miles, and leases the use of 6 miles, from Atlanta to East Point. The report is for the year ending June 30.

The company has no funded debt. It has \$1,232,200 stock and \$1,232,200 certificates of indebtedness bearing 6 per cent. interest, which were issued to stockholders as a dividend in 1881.

The earnings for the year were as follows:

	1884-85.	1883-84.	Inc. or Dec.	P. c.
Earnings.....	\$410,222	\$412,640	D. \$2,418	0.6
Expenses.....	237,143	279,362	D. 42,219	15.1
Net earnings.....	\$173,079	\$133,278	I. \$39,801	29.9
Gross earnings per mile.....	4,716	4,743	D. 27	0.6
Net.....	1,989	1,533	I. 456	29.9
Per cent. of exps.....	57.8	67.7	D. 9.9	

The decrease in earnings was slight, and was much more than offset by the reduction in expenses.

The result of the year was as follows:

Net earnings, as above.....	\$173,079
Interest on certificates.....	\$73,932
Dividends, 6 per cent.....	73,932
	147,864

Surplus balance to reserve fund.....\$25,215

The usual renewals and improvements of road were made. The year resulted more favorably than was expected, and the company continues in a sound and prosperous condition.

Chicago & Northwestern.

At the close of the 26th fiscal year, May 31, 1885, this company operated 3,843.31 miles of road, the statement of mileage by divisions being as follows:

	Miles.
Wisconsin Division, Chicago to Ft. Howard, and branches.....	575.26
Galena Division, Chicago to Clinton, and branches.....	324.98
Iowa Division, Clinton to Council Bluffs, and branches.....	743.49
Northern Iowa Division, Tama to Elmore, and branches.....	369.81
Madison Division, Belvidere to Winona, and branches.....	483.53
Peninsula Division, Ft. Howard to Lake Angelina Mine, and branches.....	376.38
Winona & St. Peter Division, Winona to Watertown, and branches.....	448.48
Dakota Division, Minnesota line to Pierre, and branch.....	542.38

Total mileage worked.....3,843.31

Of this mileage 3,202.06 miles are laid with steel, leaving 641.25 miles of main track still laid with iron rails.

Additions during the year were 80.06 miles, as noted more in detail below. The average mileage worked for the year was 3,819.37 miles, against 3,719.58 miles for the preceding year.

Of the total mileage 2,458.69 miles are owned by the com-

pany directly, and 1,384.62 miles owned through proprietary companies. Of the whole line 510.50 miles are in Illinois; 920.91 in Wisconsin; 308.49 in Michigan; 1,112.08 in Iowa; 414.47 in Minnesota, and 576.86 miles in Dakota.

The additions last year were the Ottumwa, Cedar Falls & St. Paul Branch, from Belle Plaine, Ia., to the Muchachinock coal fields, 64 miles, and the Princeton & Western Branch, from Wisconsin Valley Junction, Wis., to Necedah, 16.06 miles.

The company also owns, through ownership of stock, the Sioux City & Pacific, 107.32 miles, and the Fremont, Elkhorn & Missouri Valley, 311 miles; but the accounts of those roads are stated separately and not included in the figures below.

The equipment consists of 672 locomotives; 263 first-class passenger, 43 second-class passenger, 7 parlor, 9 dining, 26 mail, and 127 baggage and express cars; 11,668 box, 1,925 stock, 450 gondola, 2,203 flat, 3,857 iron ore and 321 caboose cars; 6 officers' and pay cars; 18 boarding, 25 dump, 80 ditching and 28 pile-driving and wrecking cars. The increase last year was 33 locomotives; 16 passenger, 4 second-class and 6 baggage cars; 1 caboose and 3 stock cars; 40 dump and ditching cars.

The general balance sheet, condensed, is as follows:

Liabilities.	
Stocks, common.....	\$41,374,866
" preferred.....	22,325,455
" proprietary lines.....	11,220,000
Funded debt.....	91,460,500
Sinking funds.....	1,934,000
General liabilities.....	812,000
Operating liabilities (current accounts).....	4,053,223
Income account, balance.....	9,782,819
Land income account.....	2,954,245
Total liabilities.....	\$185,897,108
Assets.	
Road and equipment.....	\$162,393,104
Trustees of sinking funds.....	1,934,000
General assets, securities owned, etc.....	14,063,402
Materials.....	1,808,567
Accounts receivable.....	1,890,844
Cash.....	3,807,191
Total assets.....	\$185,897,108

Common stock was increased last year by \$14,757,600 issued on account of purchase of the Iowa leased lines. The bonded debt was increased by \$4,914,500 Iowa leased line bonds assumed; \$540,000 issued on new lines, etc.; \$4,000,000 debenture 6s and \$1,500,000 Northern Illinois bonds, a total of \$10,954,500. There were \$385,000 old bonds canceled, making the net increase \$10,569,500.

The substance of the balance sheet, deducting items which appear on both sides above, and others which are chiefly matters of book-keeping, is given as follows in comparison with last year:

	1884.	1885.
Cost of road and equipment.....	\$142,197,342	\$162,393,104
Cost of securities proprietary Cos.....	186,027	12,453,403
Cost of Chl., St. P., M. & O stock.....	10,315,000	1,934,000
Cash on hand.....	1,964,398	3,807,191
Balance of sundry accounts.....	80,889	444,187
Total.....	\$154,744,616	\$179,097,885
Represented by:		
Common stock and scrip, C. & N.W.....	\$26,617,366	\$41,374,866
Ry. W. Ry.....	22,325,455	22,325,455
Capital stock of proprietary roads.....	12,785,000	11,220,000
Funded debt.....	80,891,000	91,460,500
Land income account.....	2,938,675	2,954,245
Railroad income account.....	9,187,120	9,782,819
Total.....	\$154,744,616	\$179,097,885

The changes in capital stock and funded debt (except as noted above) were chiefly on account of the purchase of the Iowa leased lines. The increase in cost of road and equipment was \$20,195,763, of which the sum of \$1,242,967 was for new equipment and improvements, \$1,338,646 for new road built, and the balance for the cost of the leased lines.

The traffic for the year was as follows:

	1884-85.	1883-84.	Inc. or Dec.	P. c.
Train miles.....	5,339,699	5,331,828	I. 7,871	5.6
Passenger.....	10,711,876	10,718,354	D. 6,478	0.1
Freight.....	5,441,035	5,675,307	D. 234,272	4.1
Serv. and switch.....				
Total.....	21,992,610	21,925,449	I. 67,161	0.3
Pass. car miles.....	26,648,099	25,969,521	I. 678,578	2.6
Fr. car miles.....	204,905,263	210,708,299	D. 5,803,036	2.3
Pass. carried.....	8,403,884	8,623,483	D. 219,599	2.5
Pass. miles.....	231,090,788	256,386,389	D. 25,295,601	9.9
Tons fr. carried.....	8,235,127	8,453,994	D. 218,867	2.6
Ton-miles.....	1,410,789,305	1,350,173,773	I. 60,615,532	4.9

Av. train load:
Passengers, No. 39.57 46.35 D. 6.78 14.6
Freight, tons.....125.30 125.97 D. 0.67 0.5
Av. rate:
Per pass. mile.....2.38 cts. 2.40 cts. D. 0.02 ct. 0.8
Per ton-mile.....1.19 " 1.31 " D. 0.12 " 9.2

Locomotive service cost 19.74 cents per mile run, a decrease of 1.31 cents, or 6.2 per cent. The average passenger train last year was 4.44 cars; the average freight train 19.13 cars. The average passenger journey was 27.50 miles, and the average freight haul 169.16 miles.

The average passenger train earned \$1.11 per mile run, and cost 58 cents, leaving 53 cents net earnings. The average earnings per freight-train mile were \$1.59, and the expenses 97 cents, leaving 62 cents as net earnings. On each working day there was an average of 291 passenger trains and 521 freight trains on the lines.

The earnings for the year were:

	1884-85.	1883-84.	Decrease.	P. c.
Freight.....	\$16,917,394	\$17,677,868	\$760,472	4.3
Passengers.....	5,498,111	6,153,071	\$654,960	10.6
Mail and express.....	870,938	921,873	\$50,935	5.5
Miscellaneous.....	215,613	267,814	\$52,201	19.5
Total.....	\$23,502,056	\$25,020,624	\$1,518,568	6.1
Expenses.....	13,793,907	15,140,957	\$1,347,050	8.9

Net earnings.....	\$9,708,149	\$9,879,667	\$171,518	1.7
Gross earn. per mile.....	6,153	6,727	574	8.6
Net.....	2,542	2,656	114	4.2
Per cent. of exps.....	68.7	60.5	8.2	

Taxes are included in expenses; they amounted last year to \$690,928, or 2.9 per cent. of the gross earnings.

The following table shows the average mileage worked and the earnings per mile, etc., for eight years past:

	Miles operated.	Earnings per mile.	Per cent. of expenses and taxes.	Net earnings per mile.
1878.....	2,036.98	\$7.242	51.66	\$3,500
1879.....	2,129.37	7,948	58.86	3,228
1880.....	2,215.83	7,830	48.30	4,025
1881.....	2,644.16	7,312	53.92	3,399
1882.....	3,032.90	7,809	53.37	3,642
1883.....	3,404.70	6,951	58.44	2,889
1884.....	3,719.58	6,727	60.51	2,656
1885.....	3,819.37	6,153	58.89	2,542

The decrease in earnings last year was largely due to the

decrease in iron ore tonnage and the very low rates obtained on that class of freight. This decrease was nearly made up by the reduction in expenses.

Renewals included 9,939 tons steel rails and 825,879 new ties. The usual improvements were made, including 14 miles of new second track and a number of new bridges, buildings, etc.

The result of the year was as follows:

Net earnings, as above.....	\$9,708,149
Interest on bonds.....	\$5,064,534
Sinking funds.....	58,000
Rental accounts, old balances.....	28,567
Dividends.....	3,981,349
	9,132,450

Balance, surplus for the year.....\$575,699

The net revenue from the Land Department, in addition to the above surplus, was \$557,390. The dividends paid were 8 per cent. on preferred and 7 per cent. on common stock.

A condensed summary of the operations of the year is as follows:

Surplus for the year as above.....	\$575,699
Net increase in capital stocks.....	13,192,500
" funded debt.....	10,569,500
Balance from land grants.....	15,570
Decrease in supplies.....	396,792
Increase in sundry liabilities.....	176,544
Total.....	\$24,926,605
Cost of Iowa leased lines.....	\$18,643,006
Balance, cost of construction.....	552,687
Stock, Fremont, Elk. & Mo. Vy.....	1,968,500
Increase in cash.....	1,842,492
Increase in sundry assets.....	921,850
	24,926,605

The cash receipts of the Land Department, derived from sales of lands and lots, deferred payments, interest, trespass and stumpage, amounted to \$653,190 for the year. The total number of acres sold was 90,071, and of lots 671, and the consideration received therefor was \$588,684. The amount due to the Land Department on outstanding contracts for lands sold was \$987,287, and for lots sold, \$136,894, making the total assets on outstanding contracts at the close of the fiscal year \$1,124,181.

The quantity of land in the various grants unconveyed on May 31 last was 1,757,079 acres, of which 1,373,272 were unsold, and 383,747 acres held under contracts of sale.

President Keop's report says: "The company has found it necessary to begin the construction of about 75 miles of railroad, projected as a coal road, under the charter of the Northern Illinois Railway Co., extending from the coal deposits adjacent to La Salle, Ill., to Belvidere on the Freeport line, where it forms a direct connection with the lines of this company for the distribution of coal in the state of Wisconsin and throughout the Northwest. The line will be a great local convenience to the company in reaching a supply of fuel by the shortest and cheapest route for its own consumption and for the wants of the general public. It makes a short connecting link between the Freeport and the Dixon air lines which has long been needed, and will save many miles of haulage in the movement of cars to and from these lines.

"The means for its construction are procured by the issue and sale of the Northern Illinois Railway first-mortgage 5 per cent. 25-year bonds, at the rate of \$20,000 per mile on the 75 miles, amounting to \$1,500,000, and the bonds are guaranteed, principal and interest, by the Chicago & Northwestern Co., which is the sole owner of the property. The mortgage provides for an issue of \$1,600,000 of the bonds, but \$100,000 are reserved for a branch of 5 miles adjacent to La Salle, and cannot be issued until the branch shall be built.

"The purchase of the Iowa leased lines, which was explained in the last report and approved by the stockholders at their annual and special meetings in June, 1884, was fully consummated during the year, and these properties, to wit, the Chicago, Iowa & Nebraska Railroad, the Cedar Rapids & Missouri River Railroad, and the Maple River Railroad, with their franchises, have become merged with the Chicago & Northwestern Railway Co.

"The fixed charges for the year, with 7 per cent. paid on the common stock issued for their purchase, amounted to \$1,389,040, as follows:

7 per cent. on \$4,914,500 bonds assumed.....	\$244,015
7 per cent. on \$14,757,500 stock issued.....	1,033,025
Annual charge for Albany Bridge, Clinton, Ia.....	12,000